

# The Mining And Metallurgical Journal

VOL. XXII. NO. 2

LOS ANGELES, CAL.,

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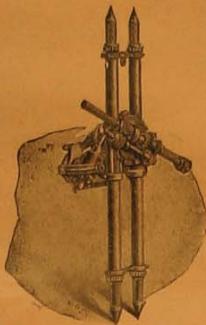
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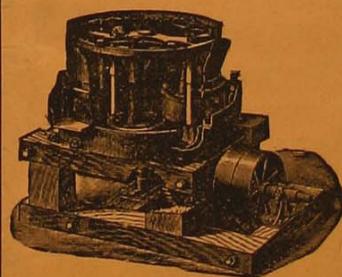
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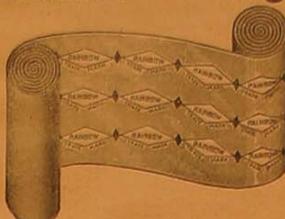
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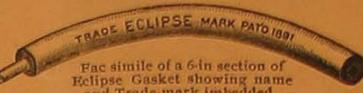
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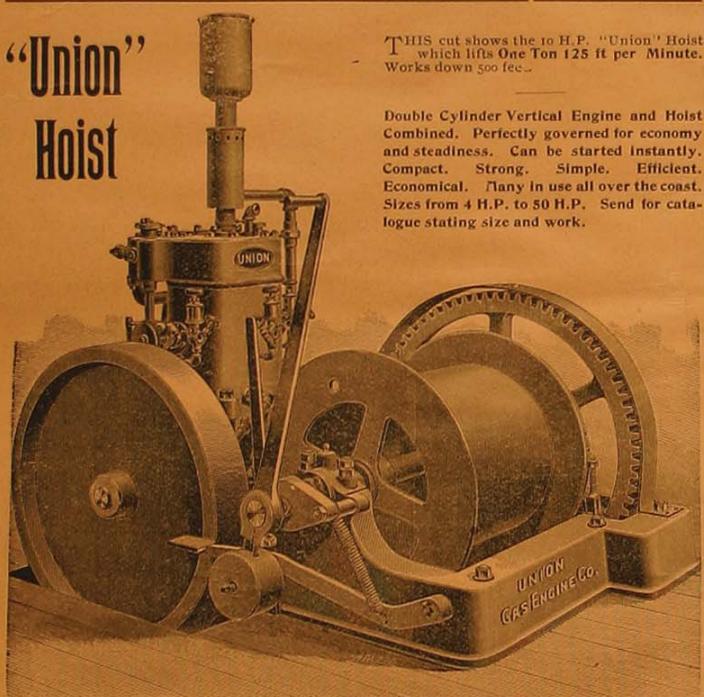
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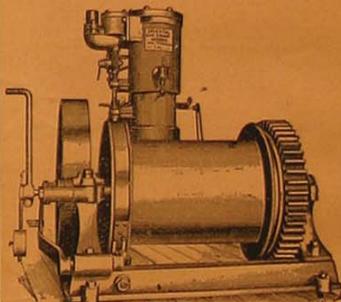
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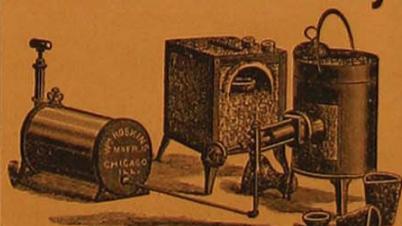
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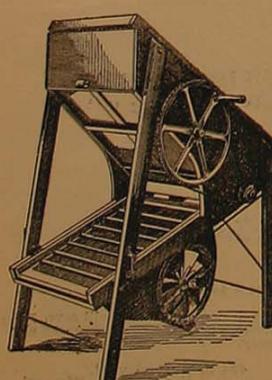
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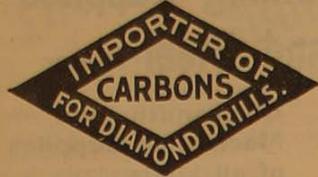
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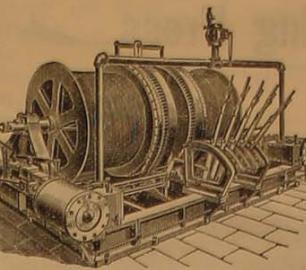
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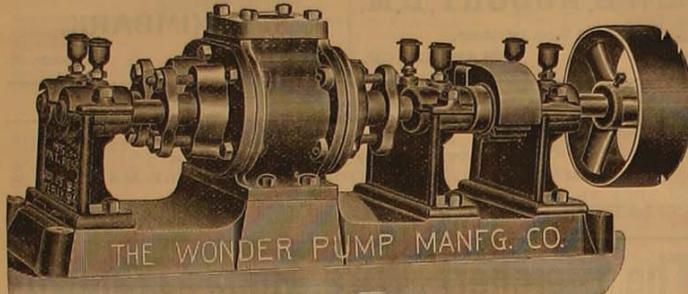
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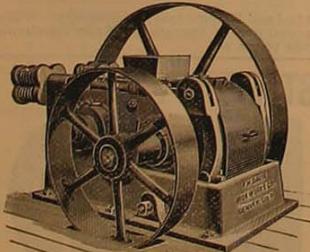
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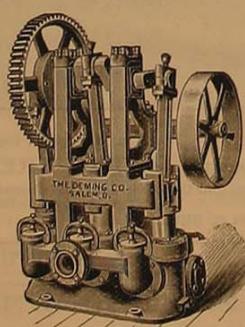
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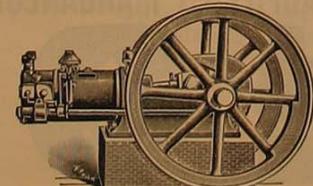
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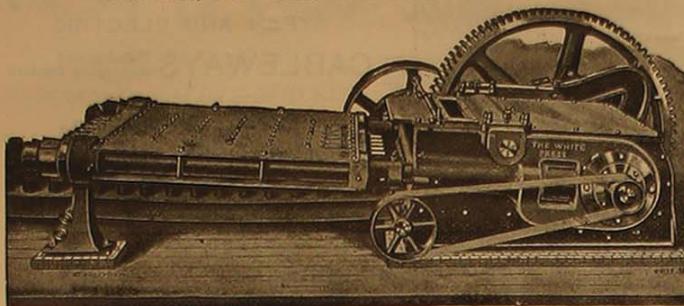
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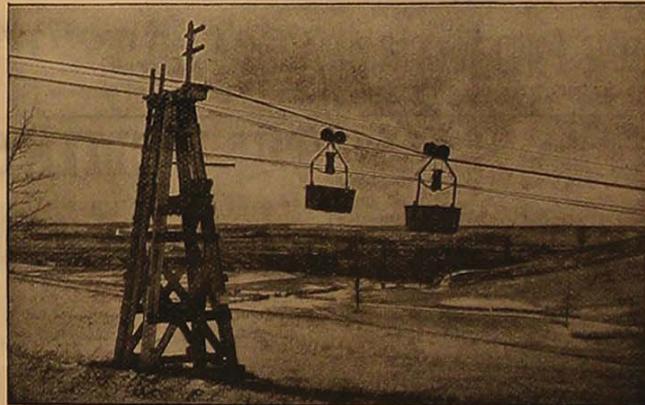
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## AMERICAN INSTITUTE OF MINING ENGINEERS.

The special train from Portland, Oregon, which brought the visiting members of the Institute across the continent was met at Montague, Cal., on the 23rd ult. by a reception committee, of twenty one, from the California Miners' Association, and visited Shasta Springs. On 24th, Keswick and the Mountain Copper Co.'s mines and smelter were inspected. On the morning of the 25th San Francisco was reached and the first session was held that afternoon, when W. C. Ralston, Chairman of the executive committee of the California Miners' Association, presented an address of welcome, which was replied to by President, James Douglas, New York.

The first paper was: "The Origin of the Yosemite Valley, and the Eroding Effect of Glaciers," by Prof. Wm. P. Blake, Tucson, Ariz., after which "Notes on Mining Cable Tests and Physical Tests of California Timbers," by Prof. Frank Soule, University of California, was given; and "The Construction of La Grange Dam," by E. H. Barton, Sonora, Cal., both of them in abstract.

The following papers were presented in print: "Stoping with Machine Drills," by Bert. Thane, Sumiden-Chief Mine, Alaska; "Deep Mining at the Utica," by J. H. Collier, Tesla, Cal.; "Note on Plate Amalgamation," by Allan J. Clark, Lead, South Dakota; "The Mines and Mill of the Atacama Mineral Co., Ltd., Taltal, Chili," by Sydney H. Loram, Chingford, Essex, England; "Investigation of Magnetic Ores from Eastern Ontario," by Frederick J. Pope, New York City; "The relative Desulphurizing Effect of Lime and Magnesia in the Iron Blast Furnace," by O. R. Foster, Brooklyn, New York.

Monday evening, 8 to 10:30 P. M., a grand promenade concert was given in the Palace Hotel court. Music by Cassasa's band.

Tuesday, September 26, "The Electromotive Force of Metals in Cyanide Solutions," by Prof. S. B. Christy, University of California, illustrated, was read in abstract; and "Some Features of the Economic Geology of Russia," by Prof. A. C. Lawson, University of California, was read; also, "The New Alaska Treadwell Gold Mills," by Robt. Mein, Oakland Cal.

The following papers were presented in print: "The peculiar Ore Deposit of the East Murchison United Gold Mine, Western Australia, by D. P. Mitchell, Palo Alto, Cal.; "The Occurrence of Tin Ore at San Alto, Acatecas, with reference to similar deposits in San Luis Potosi and Durango Mexico," by Edward Halse, Columbia, S. A.; "The Copper Deposits of Vancouver Island," by William N. Brewer, Victoria, B. C.; "Rock Salt in Louisiana," by A. F. Lucar, Lafayette, La.; "The Lee Long-Wall Mining Machine," by H. Foster Bain, Des Moines, Iowa; "Natural Coke of the Santa Clara Coal Field, Sonora, Mexico," by E. T. Dumble, Houston, Texas; "Trans-Continental Railway Lines," by James Douglas, New York City.

Wednesday, September 27. The following were read in abstract:—"Electricity, as applied in California Mining Practice," by Prof. C. L. Cory, University of California; "The Geology of Arizona," by Prof. Theo. B. Comstock, Los Angeles, Cal. "Tangential Water Wheels," by W. A. Doble, San Francisco, Cal., was read, and "Early History of Anthracite Coal, in connection with the Manufacture of Pig Iron," by Samuel Thomas, finished the reading of papers.

The following papers were read by title:

"Notes on the Independence Mine at Cripple Creek, Colo.," by T. A. Rickard, Denver, Colo.; "Gold Milling at Minas, Prietas," by E. R. Abadie, Torres, Sonora, Mexico; "Treatment of Oxidized Ores of the Lake View Consols Mine," by J. W. Sutherland, Boulder, Western Australia; "The Effect of Heat Treatment upon the Physical Properties and the Microstructure of Medium-Carbon Steel," by Robert G. Morae, Jamaica Plain, Mass.; "Peculiar Forms of Native Gold," by Geo. F. Kunz, New York City; "The Cement Rocks of Illinois," by J. A. Ede, Spring Valley, Ill.; "The Temperature at which certain Ferrous and Calcis Silicates are formed, and the effect upon these temperatures of the presence of certain Metallic Oxides, by H. O. Hoffman, Boston, Mass.; "Wolframite Deposits in South Dakota," by A. Forsythe, Rapid City, South Dakota; and "Nickel Steel, a Synopsis of Experiment and Opinion," by David H. Browne, Cleveland, Ohio.

Visits were made to the University of California, and the works of the Selby Smelting and Lead Company. In the evening a banquet was given to the visitors, by the merchants of San Francisco and the California Miners' Association. On the 28th, the visitors left San Francisco for northern mining camps and the trip to the Yosemite.

## MINING GOLD ORE.

In the operation of mining gold ore, it is generally necessary to look more carefully after small details in all branches than is required in mining other ores. On account of the gold generally being found in pay shoots, or the fact that only certain parts of the vein matter carry gold in paying quantity, or what is the same thing, that part of the vein holds pay ore and part does not, is a condition in gold mining which requires the greatest care and experience on the part of the management of the mine. If no record or plan of the workings is kept at the mine, and the value of the ore which has been sunk through, drifted on, or stoped is not recorded daily on the plan as work advances, then the operations are left to the record of memory, and good systematic work cannot be expected.

Unless all parts of the workings are tested as to value foot by foot as the work advances, and a record kept on a plan, then the operations are being conducted in the dark, or in a manner which generally ends in failure. The custom is common to make tests of the ground operated, but the keeping of a system which records values on a plan of the workings is as necessary and valuable for future aid and reference. In doing so the history of the mine values is kept and much instruction can be obtained from such data. The neglect of this precaution has been the common cause of failure among those who are newly embarked in gold mining. A mine plan used for that purpose has a double value, and becomes a valuable book of reference and a guide in planning future work, as well as a guide at times in solving problems, as to the geological conditions governing the formation or deposition of the gold.

## FUEL SUPPLY OF THE SOUTHWEST.

A cheap fuel supply has an all-important bearing on the manufacturing and industrial development of any country, especially where smelting and metallurgical processes are to be conducted. Hard fuel or bituminous coal is

high priced at present in the Southern California market, as it has to be imported by water from British Columbia, Australia or England, or by rail from New Mexico. The Pacific Coast lignite coal, so far as yet developed, is hardly a factor in the fuel supply worth mentioning, as the amount produced is small and rather uncertain. It is only used in the neighborhood of the mines and for household use to a small extent. The imported article, in vessel cargo lots costs about \$7.50 per ton. For steam purposes the local asphaltum or crude oil at \$1 to \$1.50 per barrel has in many cases diminished its use for industrial and even railway purposes, by being more easily handled. Three barrels of oil are considered equal to one ton of steam coal. For roasting ore fuel oil is superior to coal, as it can be easily regulated, but for blast furnace use, hard fuel or coal and coke, have to be used under present conditions. The construction of railway lines through the desert country to the coal fields of southwestern Utah is therefore an all-important subject to the mining interests of the southwest. With that desirable object once attained, the manufacturing and industrial development of the southwest would receive a stimulus that nothing else could give to it. With cheap bituminous coal or coke from Utah and our cheap fuel oil, the Pacific Coast could enter into many branches of industry to supply the new and increasing markets of the Pacific Islands, the Orient and South America, which are at the present time supplied from Europe. Adequate railway facilities are required to bring that desirable change about and the present is a fitting time to have it accomplished. The large and varied natural resources of the southwest require a good measure of railway expansion to comply with the necessities of the case and fill the conditions which the circumstances warrant.

#### RAILWAY EXTENSION NEEDED.

That section of country between the Colorado river on the east, and the Sierra Nevada range of mountains on the west which is commonly called in the southern part the Colorado desert, and in the more northerly portion the Mojave desert, has during the past two years attracted the attention of prospectors and miners to such an extent, that their efforts in the line of new discoveries now warrant the extension of railway lines through these so-called deserts, but still rich mineral districts. It is true that a short line has been built from Kramer to Johannesburg, but recent developments in the country north of the Randsburg district necessitates the continuation of that line to join the line of the Carson and Colorado Railway at Keeler in Inyo county.

Surveying parties were in the field last winter for a line which would run from southern Nevada in a southwest direction and about half way between the line already mentioned and the Colorado river. Such a railroad is required to connect the coal fields of Utah with Southern California. In the Ivanpah, Cal., and Searchlight, Nev., districts, recent mining developments of a substantial nature warrant the building of a branch line to supply existing demands for carrying ore and supplies and open up a rich new mining territory by extending the branch line from Blake or Manvel on the Santa Fe. The large established trade of Arizona in mineral products warrants the construction of a railway line from San Diego, Cal., via Escondido and San

Luis Rey river to Warner's ranch and Yuma and westward to connect with existing lines. The construction of a new railway line makes traffic under ordinary circumstances, but in the rich mineral section of Southern California between the mountains and the Colorado river, northerly and southerly lines are required to connect the at present isolated camps with the seaboard and base of supplies and to make accessible the great variety of minerals which require railway transportation to bring them to market and give them value.

#### TRUSTS.

No subject, not even the Philippine war nor the money question is so much in the public mind and so much discussed in the newspapers and political circles as trusts. Just what they portend and how to deal with them are what is occupying the brains of politicians, the legal fraternity, and some of the public officials.

There is a general apprehension that evils will result from trusts, and, consequently, public opinion in the main is adverse to them. The conference called by the civic confederation in Chicago, disclosed some divergencies of opinion as to the results that will flow from trusts, and very little well-digested opinion as to the remedies for the ills it is apprehended they will inflict upon the country, while there was much discussion of the subject, no definite plan of dealing with trusts was decided upon.

The apologists and defenders of trusts assert that they are a logical outgrowth of economic conditions. The tremendous advances in the use of machinery in the manufacturing industries make concentration inevitable. Diffusion of effort such as formerly prevailed, could not supply the world's demand for consumption, for the reason that through the influence of civilization, human wants have increased immensely out of proportion to the increase of population. Manufacturing in a large plant with concentrated machinery and labor can be done cheaper than where done through diffused effort and in smaller plants.

The defenders of trusts say that by combining numerous or all the plants devoted to a particular industry that they can produce still cheaper, which does not clearly appear, especially when the plants are remote from each other. Plants are purchased to be discontinued, in order to promote the business of those to be retained in service.

There can be no doubt industrial trusts are promoted for the special purpose of controlling production, that it may not be so abundant as to reduce prices below a point that will yield the desired profit. Trusts are intended to be a monopoly through which three things can be accomplished. First, fixing the prices to be paid for raw materials; second, dictation of the wages of laborers; and, third, controlling the prices at which their fabrics shall be sold.

With these triple powers in one hand, it would be marvelous should oppressive terms be not imposed. Selfishness is universal in humanity, more highly developed in some than others, but it is ample in the great body of men to lead to a distrust of any pretension of dealing considerably of the interests of others. Hence, exorbitant and oppressive exactions are expected if trusts are permitted to exist, or are not placed under rigid legal restraint.

On account of the dual character of our government, the legal remedy must be of a

double character. The states cannot interfere with interstate trade, and the general government cannot deal with that which is local within the states, while a state may prescribe the terms upon which a corporation formed in another can acquire a domicile, or can forbid domiciliation altogether, still it cannot forbid such a corporation selling its goods in the state on the same terms as those accorded to its own citizens, or the citizens of all other states.

The legal restraints or inhibitions must be by the state and nation, the former being applicable to local traffic, and the latter applying to that which is interstate. It is probable that it will be some time before all the states will have adopted a uniform policy, for such states as New Jersey and Delaware raise a considerable part of their revenues from fees for the promotion of corporations under their statutes granting monoplistic privileges. It is a money-making business with them.

#### Pyritic Smelters.

The interest taken in the erection of pyritic smelters in different parts of the state, Colorado, has caused some misapprehension in regard to the scope of this class of smelters, many people believing that they will, in a measure, take the place of the regular smelters, and thus relieve the situation brought about by the strike.

A pyritic smelter does not handle the same class of ores that are sought for by the lead and copper plants, and therefore does not handle the same class of ores that are sought for by the lead and copper plants, and therefore does not have any influence upon the present conditions. The effect of the success of a pyritic smelter in any locality is in favor of the big smelting companies, as the product is desirable, and must be smelted over again for the extraction of the values. The pyritic smelters simply effect a fire concentration, eliminating the silica and base material of all kinds, and producing the metallic contents of the ore, iron copper, silver, etc., in the shape of an iron or copper matte. This matte is sold to the smelters, and is eagerly sought for by them, as containing little more than the metallic ingredients of the ore as it is own flux and easily handled.

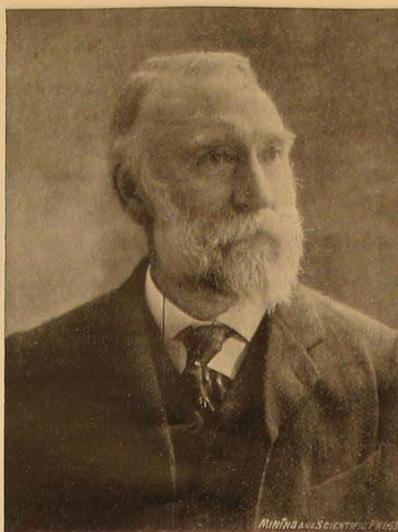
The advantages of a pyritic smelter are that it can be cheaply operated, the sulphur carried in the pyrites serving as fuel, and greatly reducing the quantity of coal necessary; that it can be built anywhere, the nearer the ore the better, thus obviating the expense of transportation to a great extent; that it can be constructed at a comparatively light cost, and that it can treat ore at a profit, reducing it to matte, which does not carry sufficient values to stand the cost of transportation and regular treatment charges. The matte produced generally carries high values, and is treated at a merely nominal price by the smelters, the heavy excess of iron making it extremely desirable for mixing with ores having a less percentage of iron.

So far from affecting the smelters adversely, the pyritic furnaces will increase the production of ore, and the business of the regular smelters, and their construction in large numbers in this state will be hailed with pleasure by the smelting companies.

The report of the University Geological Survey of Kansas states that the value of the waste dumps of zinc mines in that section exceeds \$1,000,000.

## OFFICERS A. I. M. E.

The largest technical society in America is the American Institute of Mining Engineers. It was organized by Richard P. Rothwell at Wilkesbarre, Pa., in 1871. The first president was David Thomas, who is referred to as the father of the anthracite iron business in America. At present the personnel of the official staff is as follows: President, James Douglas, New York City; vice presidents, E. D. Peters, Jr., Dorchester, Mass.; Albert R. Ledoux, New York City; Leon P. Feustman, Mexico City; E. C. Potter, Chicago, Ill.; Geo. F. Kunz, New York; W. N. Page, Ansted, W. Va.; managers—C. W. Goodale, Great Falls, Mont.; Frank Lyman, Brooklyn, N. Y.; Frank McM. Stanton, Houghton, Mich.; Richard P. Rothwell, New York; W. J. Olcott, Duluth, Minn.; W. B. Devereux, New York; Arthur Winslow, Kansas City, Mo.; William Glenn, Baltimore, Md.; W. J. Taylor, Bound Brook, N. J.; secretary, R. W. Raymond, New York; treasurer, Theo. D. Rand, Philadelphia, Pa. James Douglas, president of the Institute, is a prominent figure in the mining and metallurgical world, and



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has contributed numerous valuable technical papers to the Institute.

Edward D. Peters, Jr., one of the vice-presidents now in office, has become familiar to mining men through his works on copper smelting and his contributions to the literature of the Institute.

Rossiter W. Raymond, Ph. D., one of the earliest vice-presidents of the association, and at one time president, has for years been the secretary of the institute, performing the manifold and arduous duties of that office with distinction to himself and to the eminent satisfaction of the members, as attested by his re-election at each annual meeting.

Theodore D. Rand, treasurer of the Institute, is also vice-president of the Franklin Institute of Philadelphia, Pa.

Richard P. Rothwell is at present one of the board of managers. He is a successful mining and metallurgical engineer and has wide fame in current technical literature and statistical compilation. He declined the offered first presidency of the Institute, believing that an older man should have it, and proposed Mr. David Thomas. In 1882 Mr. Rothwell was elected president.



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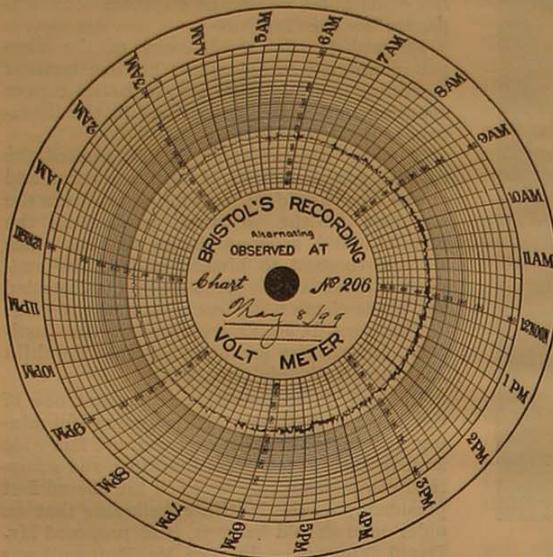


FIG. 19—TYPICAL CHART OF VOLTAGE REGULATION.

## THE USE OF ELECTRICITY IN MINING.

## The Kootenay-Rosslan Power Transmission.

BY GEO. P. LOW.

(EDITOR OF THE JOURNAL OF ELECTRICITY.)

[Continued from our issue of September 1st, 1899.]

All the electric lighting in Rosslan, in both arc and incandescent services, is rendered from alternating circuits, and indeed the only use to which direct currents are put in the Kootenay plant is for the excitation of generators and synchronous motors. The electric lighting load reaches a maximum of nearly 400 horsepower. Enclosed alternating arc lamps are used exclusively and these are burned from the 110-volt commercial circuits. The ultimate distribution is on the Edison three wire system through the use of type H transformers taking either 1400 or 2080 volts on the primary and delivering 230 volts across the outside of three-wire service. The utmost care has been exercised in preserving the balance on the three-wire distribution circuits as well as in balancing the primaries of the commercial transformers on the three-wire, three phase, 2200-volt circuits, and this balancing has been carried out so well that it has never been observed that the phases of the 2200-volt circuits have been more than 10 amperes out of balance.

As stated heretofore, the principal interest in the Kootenay-Rosslan transmission centers in its application of electric power for mining and milling purposes, the most notable installations being in the properties of the War Eagle Mining & Development Company, the British Columbia Bullion Extraction Company, the British American Corporation, and the Gertrude, Big Three and Iron Mask

mines. These six properties alone consume about seventeen hundred horse-power in the operation of hoists, compressors, crushers, conveyors, ventilating blowers and in electroplating work. The bulk of this power is delivered by induction motors, for, as a general rule, synchronous motors have been applied only to the driving of compressors.

The illustration, Fig. 23, gives a general view of the controller of the War Eagle hoist which will be seen to be a standard General Electric induction motor. It is a three phase equipment operated at 2300 volts, has twenty-four poles and delivers three hundred horsepower at three hundred revolutions per minute. Its technical designation is, therefore, "I 24 300-300 form A." The rotor shaft is geared to a Lidgerwood type double drum hoist through double reduction gearing, having a ratio of reduction of 300 to 40. The War Eagle shaft is at present down a little beyond the 600-foot level and the maximum load raised amounts to eight tons including the load, cage and rope, the speed being 720 feet per minute for this load.

Interest of course centers in the method of speed control, each technical detail of which is fully shown in the accompanying photographs and drawings. Secondary control is used exclusively; that is, no effort whatever is made to control the primary current, while the secondary current, or that induced in the rotor circuit, is varied by the introduction of external resistance. The controller proper, shown in Fig. 23, is a duplex one inasmuch as the movement of the controller handle manipulates both the primary and secondary circuits of the motor, the former for making, breaking and reversing and the latter for the control of the variable external resistance. The controller on the high tension or stator side operates in a bath of mineral oil. The secondary windings are led to three collector rings bear carbon brushes which cover about 90 degrees of the surface of the rings, this being a necessary procedure because of heavy amperage to be taken off. The maximum secondary electromotive force obtained is in the neighborhood of seventy volts. From the rotor brushes the current is carried to the low tension side of the controller through which resistance may be cut in or out of the rotor windings in ten steps. The resistance consists of cast iron grids arranged upon a large slate resistance board as shown in Figs. 25 and 26.\* With the maximum load of eight tons gross at a speed of 720 feet per minute the current reaches a maximum of 110 amperes per phase, dropping back to 90 amperes as the load decreases by the reason of the cage nearing the surface. With a load of men the maximum current is 70 amperes per phase.

The principle under which variable speed is attained in the operation of this induction motor is found in the fact that while in the synchronous motor, exact synchronism between the motor and generator must always be maintained, yet the induction motor is so constituted as

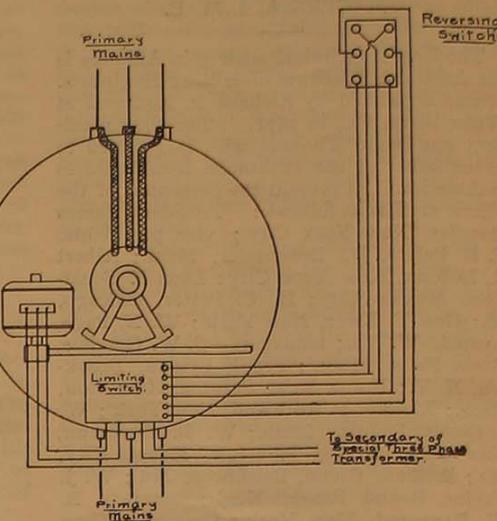


FIG. 20—CONNECTIONS OF INDUCTION REGULATOR.

to be nearly independent of any magnetic slippage that may exist between its stator and rotor. When under full speed the motor is practically in synchronism with the generator but with the generator speed constant a variable speed in the motor is best attained by the introduction of methods that will provide variable slippage as desired, for the greater the slippage the slower will be the speed of the rotor. The equipment at the War Eagle hoist is so controlled that the speed of the motor may be varied from forty revolutions or less per minute to its full speed of three hundred revolutions.

As will be seen in Fig. 23, the high and low tension controllers are geared together, this being done in such a manner that both are actuated at proper intervals by the manipulation of a single controller handle. The only function of the electrical equipment is that of hoisting, for as the cages are balanced one against the other, it is the rule that power is applied for either direction of rotation. Braking is done through the application of band brakes by means of the hand levers shown in the illustration, Fig. 24.

The subjoined diagram of circuit connections, Fig. 21, shows the development of the reversing cylinder as applied to the high tension controller. The headboard of this controller has six terminal lugs, those numbered 1, 2 and 3 being for the service leads, while those numbered 4, 5 and 6 are carried to the motor. The controller applies the full line potential of 2300 volts to the stator, and it

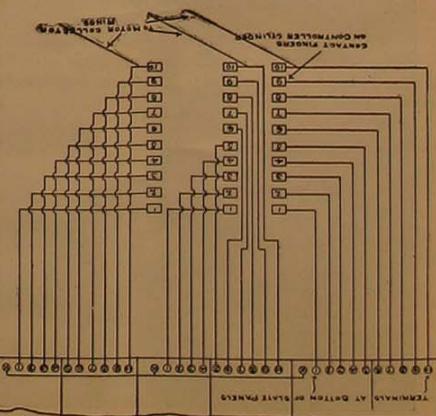
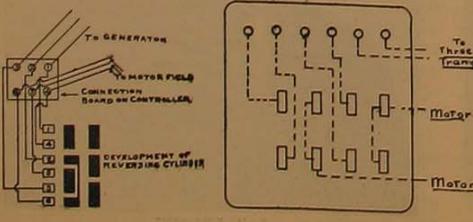


FIG. 22—CONNECTIONS OF INDUCTION HOIST MOTOR AND CONTROLLER.



CIRCUIT CONNECTIONS

FIG. 21  
CONNECTIONS OF LINING SWITCH

\*See our next issue.

serves not only as a make and break switch but also as a pole changer for reversing. The short circuiting of terminals 1 to 4, 2 to 6, and 5 to 3, causes a given direction of rotation, while the short circuiting of terminals 1 to 4, 2 to 5, and 3 to 6 cause an opposite direction of rotation, all as shown in the attached circuit diagram. Mineral seal or any high grade transformer oil may be used for the bath for this high tension controller, which gives perfect satisfaction in operation.

The connections of the circuits by means of which external resistance is cut in and out of circuit with the rotor windings through the low tension controller are outlined in Fig. 22 and in Fig. 27 is given the assembly diagram of the stationary cast iron resistance as mounted on the slate resistance board shown in front and back views in Figs. 25 and 26\*. It must be understood that the terminals at the bottom of the slate panels appearing in the upper portion of Fig. 22 are the same as those shown at the bottom of Fig. 27. The resistance strips shown so clearly in Fig. 26 consist of cast iron grids, each in three waves, having a sectional area of about  $\frac{3}{8}$  by  $\frac{5}{8}$  inches and which have a running length of about sixty inches. Those grids stand out from the board about 14 inches and they are in 23 vertical rows by 18 horizontal ones, and while the average cross section is as given, it varies slightly above and below that figure according to the amperage carried.

Reverting to the scheme of low tension controller and resistance switch-board connections outlined in Figure 22, the leads from the slip rings on the shaft of the motor are carried to three sets of contact plates placed on the contact plates placed on the controller cylinder in ordinary arrangement, and upon these contact plates play the contact fingers which carry current successively to the resistance. Three posts are erected in the controller, each of which carries a set of ten contact fingers and two of the sets are shown in Fig. 23. As stated, the maximum potential broken by the low tension controller is about seventy volts and sparking is inconsequential.

One who is interested could spend hours in watching the operation of this hoist. It is easily handled by one man who finds himself with much less to do than has the motorman on an electric railway. In fact, the operation of the War Eagle hoist finds greater resemblance to street railway practice than one would

imagine. The controller is manipulated with the same ease and celerity that attends the handling of a street railway controller, and it is more simple than the modern street railway controller in one regard, and that is the fact that reversal is accomplished in the War

Eagle controller by the moving of the controller handle in a reverse direction rather than in the throwing of a special lever. At times when men are on the cage the hoist is "kicked" along by the momentary application of power to the motor, which enables it to be run at much slower speed even than that possible with the controller on the first notch. At other times in hoisting ore, a dead load of five tons of which is almost always carried, the motor will be brought up to speed in a very few seconds, and this without any abnormal inrush of current, for, as stated, during the writer's observation of the operation of the equipment under all conditions of service the motor intake did not exceed 110 amperes per phase. The motor has an efficiency of 92 per cent. and a full load power factor of 88 per cent., while at the slowest speed the power factor may drop to possibly between sixty and seventy per cent., but of this last statement no direct data is available at present. Current for the operation of the entire War Eagle equipment is sold by contract; *i. e.* on flat rates.

(To be Continued.)

One of the most valuable points relating to the use of belts is not often enough realized, or, at best, not emphasized; this is the fact that the more belt surface running in contact with the pulley the more power there is transmitted by the belt. In running a belt tight only about half of the pulley surface is in contact with the belt, therefore if a belt can be made to run without slipping it can be run slack and very much power will be gained. The Cling-Surface Manf. Co., 167-172 Virginia street, Buffalo, N. Y., report that they are adding scores of belts every week to the number already running slack through the use of Cling-Surface, and of the daily letters received acknowledging this, one from Alhambra, Cal., says: "After thoroughly testing Cling-Surface I find that I can run with a slack belt and get more power by far than I could with a tight belt before using Cling-Surface."

As a result of the Civic Federation Conference held in Chicago the American Anti-Trust League was formed with the following executive committee: Hon. M. L. Lockwood, Pennsylvania; Judge Wm. Prentiss, Illinois; Hon. A. M. Todd, Michigan; Hon. A. P. McQuirk, Iowa; Judge W. B. Fleming, Kentucky; P. E. Dow, New York. (Authority given to add members.)

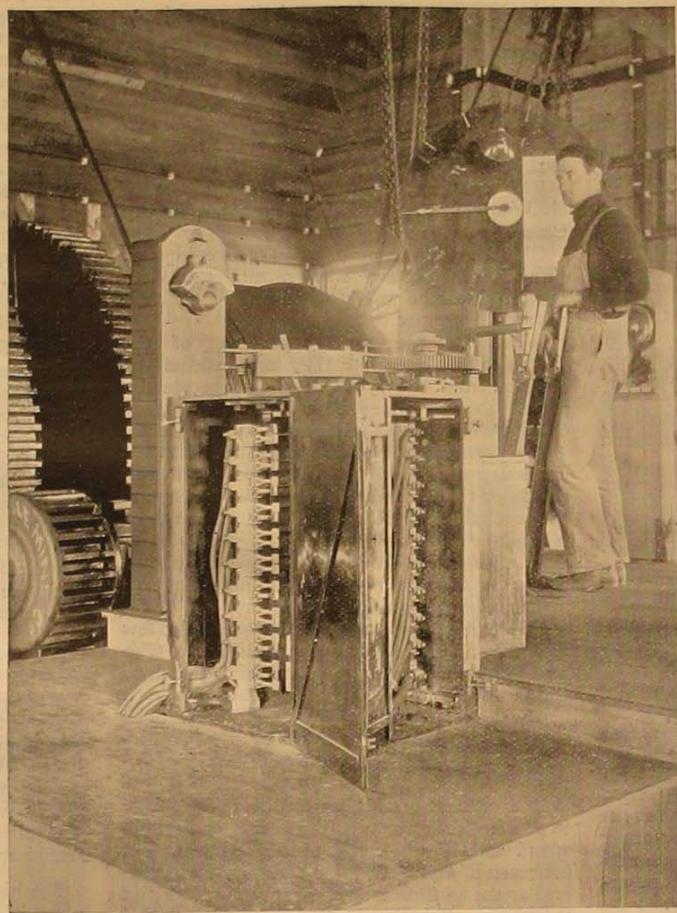


FIG. 23—VIEW OF CONTROLLER FOR INDUCTION MOTOR AT WAR EAGLE MINE.

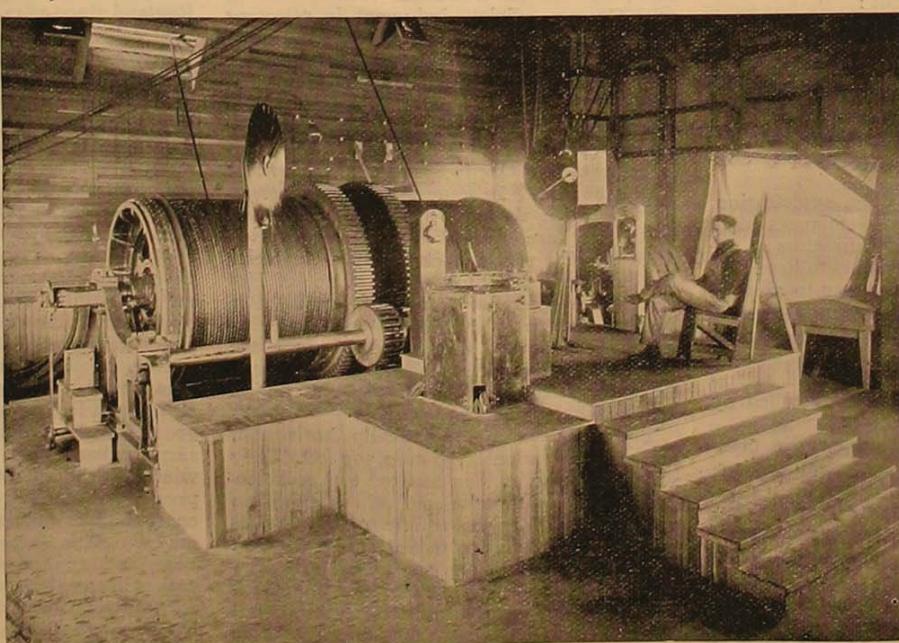


FIG. 24—GENERAL VIEW OF INDUCTION HOISTS AT WAR EAGLE MINE.

MINING AND RAILWAY CONCESSION  
BY THE CHINESE GOVERNMENT.\*

I have the honor to report the first concession ever granted by the Imperial Chinese Government to a foreign syndicate, by the terms of which foreigners have the right to open and work mines, construct and operate railways, and all entirely free from Chinese control other than the payment of a royalty and conformity with the general law of the empire applicable to foreigners.

On the 21st day of May, 1898, there were signed in the presence of the ministers of the Tsung-li Yamén articles of agreement which ceded to the Pekin Syndicate (Limited) of London, the sole right to open and work the coal and iron deposits of the entire province; also the right to construct and operate all necessary railways to main trunk lines and navigable waters for exporting the mining products.

The agreement was signed by order of imperial edict, stamped with the seal of Tsung-li Yamén as a visible sign of imperial sanction and authority, and the whole proceedings were ratified and verified by the British and Italian ministers to China.

The signing of this contract marks the most important epoch in the industrial policy of China. The precedent has been established of allowing foreigners, for commercial purposes, to own real estate in the interior of China, open and operate mines, and construct and maintain railways.

There have been many so-called mining concessions in China, but not one of them is worth the paper it is written on.

Of the railway concessions only one—the Belgian Syndicate for the Pekin-Hankau Railway—has gotten beyond the preliminary stage, and in none is the syndicate more than the financial agent of the Chinese. These railway syndicates have no voice in the management and not too much security for their money. As a matter of fact, up to date neither the Belgian Syndicate nor any other syndicate has furnished one cent of money.

The following is a synopsis of the articles of agreement between the Pekin Syndicate and the Chinese Government:

The right to open and work iron and coal deposits in certain (named) districts in the province of Shansi, and the sole right to all petroleum—these rights to exist for sixty years—are granted.

Private lands are to be purchased and on government land the syndicate is to pay double the present land tax.

All matters of administration, exploitation, management of employees and finances shall be controlled by the board of directors of the Pekin Syndicate. Each mine is to have foreign managers and one Chinaman to arrange disputes with natives. All accounts are to be kept by foreign methods, but audited annually by a native of China. All salaries are to be paid by the Pekin Syndicate, and all receipts and payments shall be controlled by foreigners.

All damage done private property in prospecting is to be paid for; cemeteries and mortuary shrines are not to be disturbed.

The Chinese Government is to receive five per cent producer's tax on the actual cost of extracting coal, iron or other material. The syndicate is to receive six per cent interest on the capital of the company, and ten per cent shall be set aside as a sinking fund with which to repay the capital. Of the balance

net profit the Chinese Government is to receive 25 per cent and the Pekin Syndicate 75 per cent. All future coal or iron mines worked with foreign capital shall pay the five per cent producer's tax.

The Chinese Government shall not be held responsible for losses.

All important machinery shall pay 1½ per cent, the regular maritime customs dues, but no likin taxes. Mining products exported from a seaport shall pay the regular export duty.

At the expiration of sixty years all machinery, plant, buildings, mines, railways, etc., revert gratis to the Chinese Government.

The syndicate shall establish a school of civil engineering and mining for about twenty Chinese students.

Chinese may buy shares in the company. (The Imperial Chinese Government has reserved £250,000 worth of shares, for which it pays cash the par value.)

When Chinese own 75 per cent of the shares of any one mine they may redeem the balance from the syndicate and operate the mine. Private mines now in operation may continue to work or sell out to the syndicate.

The syndicate has the right to build all necessary roads and bridges, open or deepen canals or rivers, and construct all railways to connect mines with main trunk railways or navigable waters.

In case China goes to war the syndicate will obey the orders of the Chinese Government prohibiting aid to the enemy.

The Pekin Syndicate is composed of a few men who control immense capital and who have obtained the most valuable concessions China could make. The preliminary work has been in progress for over two years. The concessions will be worked by the Anglo-Italian Syndicate, with a capital of £6,000,000.

The success of this enterprise is due, first, to the fact that the syndicate was willing to spend money upon the chance of getting a concession, and that, after sending their general agent to China, they simply allowed him to manage affairs here, and kept him supplied with money. Then the agent, Mr. A. Luzzatti, has shown wonderful tact in dealing with Chinese officials, judgment in selecting his assistants, in utilizing all available means to success and untiring perseverance.

The province of Shansi lies to the west of Chihli. It consists of an interior plateau of 3,000 feet elevation, more or less cut up by rivers. This plateau is bounded on all sides by mountains rising to 8,000 and 14,000 feet above the sea. In some places these ranges have been cut through by rivers, but in all parts they are rugged and transportation must be effected by pack mules or camels. In the eastern portion of the province of Honan are deposits of anthracite coal. The western half has bituminous coal covering some 12,000 square miles and all along the western boundary are deposits of petroleum. At many different points in the coal region are deposits of rich iron ore.

The coal strata is practically horizontal, and at an elevation of about 2,500 feet. They show wherever erosion has cut to a sufficient depth. This anthracite coal vein is unbroken over an area of 13,500 square miles, and its thickness is from 25 to 50 feet, an average of 40 feet. All of this deposit is within the limits of the concession. There are thousands of native coal mines now in operation, and the coal has been used probably for three thousand years. The iron ore is now worked by the natives. This entire region has been

examined by William H. Shockley, mining engineer, and Charles D. Jameson, coal engineer, both Americans and in the employ of the syndicate.

There is probably no coal field known in the world that can compare with that of Shansi, either in quality or quantity of coal, or the possibility of cheap production. In addition to the concession in Shansi there were signed on the 21st of June, an identical agreement, ceding to the Pekin Syndicate all of that portion of Honan north of the Yellow River (about 10,000 square miles), and another agreement by the terms of which all the mountainous part of Honan south of the Yellow River is ceded to the syndicate as soon as work is begun on the Shansi concession. The total area of these concessions is 71,000 square miles, equal to England and Scotland.

Baja California Illustrado.

J. R. Southworth, the well-known author and writer of Mexican works has now placed upon the market a volume, *Baja California Illustrado*, which will command the respect of all who know the Territory of Lower California. It is the first complete work on this territory that has ever been published. Lower California's mineral wealth is virtually undeveloped, but that which is developed is very carefully described in "Baja California." The historical matter has been carefully compiled, while the descriptions are largely from personal explorations made in the interest of the publication.

It is handsomely printed on fine book paper, superbly illustrated, and is written in Spanish and English parallel columns, contains 120 pages and is well patronized by the general advertisers of both Mexico and the United States. Copies of this book will be sent upon receipt of price, for cloth boards, \$2.50 and paper cover \$1.50. Address J. R. Southworth, care of Hicks-Judd Co., 23 First street, San Francisco, Cal.

The history of governmental inspection of mines in the United States begins in the anthracite coal region of Pennsylvania, in the year 1870. Mining laws had been in force in England since 1842. At each of the anthracite collieries a large structure, termed a "breaker," from 80 to 100 feet high, and containing about 800,000 feet of lumber, was required to break, assort the different sizes and prepare the coal for market. Prior to 1885, these breakers were generally erected directly over the openings through which the coal was hoisted out of the mines, in order that the coal might be hoisted to the top of the breaker at one lift. On Monday morning, Sept. 6, 1869, at the Avondale colliery, at Plymouth, Pa., the breaker, which was erected over the shaft, was entirely consumed by fire while the workmen were in the mine. The shaft was the only opening, and all the men in the mine, to the number of 108 persons, perished by asphyxiation. This created a profound feeling of sympathy for the underground workers and laid bare the great perils surrounding them. During the following winter, although strenuous opposition was presented by a few operators, the legislature enacted a law regulating the operation of coal mines. This law was approved March 3, 1870, and applied only to the mines of the anthracite coal fields. In 1877, after a successful operation of this law, another act was passed applicable to bituminous coal. Since then nearly all coal producing states have enacted laws with similar intent.

## PERU AND HER MINERAL RESOURCES.

(BY SEÑOR MANUEL ELGUERA.)  
(Concluded from our issue of Oct. 1, 1899.)

I have traveled a great deal in my country as a student at mining school and afterwards on account of my profession. In the south of Peru I have been for days passing through regions where at any place the earth could be taken up and washed, showing particles of gold; the water was scarce here. In the north of Peru about two years ago, I crossed the Maranon, the Chinchipe and other rivers, and gold is found in every one. In many of these the Indians have what they call a farm, which is made by paving the river banks with stones, and then leaving it till the next rainy season is over, when they return to these farms and remove the stones, washing the earth which has deposited itself in the crevices between the stones, and by the aid of mercury they collect the gold they need, and many of them throw the gold they do not need to carry back into the river.

In the district of Santo Tomas, province of Luya, I visited many gold beds and samples taken from them gave me three to five ounces of gold per ton. The same veins, I was assured, have given fifteen and twenty ounces. With the fall of silver many people began looking for new and old gold mines, and until now there have been great achievements (rich veins), 10, 20 and even 30 ounces of gold being found quite frequently.

A few months previous to the Klondike craze in this country, we had ours in the south of Peru, in the province of Carabaya (Department of Puno), and in Sandia, which are located in the most distant regions of Peru on the boundary line with Bolivia, and the greater part of them are on the other side of the eastern Cordillera, where the high peaks of the Illimani and Sorata are found.

To reach this region a chain of giant mountains must be crossed through the most rugged and broken passes. The mines of Carabaya are the oldest and considered the richest in Peru, and in the year 1556 a nugget was taken from here weighing 100 pounds, and also another was found there in the same year in the shape of a human head. Gold is found in veins and placers and wind drifts. Though so long known, yet this region was abandoned and even the location of its towns was lost until the sale of the St. Domingo mine to an American party, when the rush began, and in less than 18 months 2500 pounds of gold was taken from the province of Carabaya.

The Santo Domingo mine is the only one where work of any consideration has been done. The vein runs between one and eight feet, the ore being very similar in all parts, in a slate formation, the vein carrying from eight to 800 ounces per ton, and in some instances almost pure streaks of gold have been met with. This mine can be traced for about 1200 meters and undoubtedly continues. As in all "rushes" of this kind, many persons fail, owing to their lack of knowledge or preparation for the task they undertake, but those who have prepared themselves properly have been well rewarded in locating rich claims.

Roads have been improved and companies formed for the scientific work of the mines, and it will not be long before this particular place will be known as the greatest gold-producing region of the world.

I will not take your time to tell you of all the departments where gold is to be found.

The mineral production of Peru has almost

doubled itself in the last few years, owing to the application of the Lixiviation process and improved machinery. In the Cerro del Pasco the miners are changing the exploitation of silver for copper with magnificent results.

In the whole of Peru 4728 claims are registered, including petroleum, and thousands could be easily added to the number. The natural question is that, having so many and so rich mines, why do not the Peruvians work them, and the answer is simple enough: Lack of capital principally, and some failures owing to malicious miscalculations.

As the honorable delegate from Cripple Creek so beautifully told us yesterday morning about the failures owing to the sending of unsuitable persons to invest eastern capital, I will add that I have seen in many places in Peru great pieces of machinery lying wasted because they were bought to be sent there and established in regions where there were no mines, or machinery for gold mines was sent where there were only silver mines, and vice versa.

It can be safely asserted that there are not ten mines where the first state of preparation has been reached. The general idea of those who invest a few thousand dollars in mining is that it must pay immediately for the work of exploitation, and as soon as any difficulty presents itself, such as water inundation, etc., they stop work at once and commence in a new one.

The Peruvian mining laws are most liberal.

The Government grants mining claims free of cost, without other obligation or condition than a semi-annual payment of fifteen Peruvian soles, equivalent to about seven dollars gold, collected for the running expenses of the National School of Engineers.

The extent of each claim is limited to 600 feet in length, by a width varying according to the inclination of the vein; maximum 600 feet.

In the placers each claim is limited to 40,000 square metres (more than 360,000 square feet).

Each individual can possess one claim on a vein, and companies or syndicates organized to work on a large scale may have ten or more claims on the same vein or placer, in proportion to their working capital.

A law passed in 1890 provided that during the lapse of twenty-five years the semi-annual tax would not be increased; but lately the Government has asked Congress to modify this law as relating to gold mines and placers.

Until Congress decided this modification, grants of gold claims are suspended to any person or company who in their petition do not express their willingness to abide by whatever resolution Congress may reach on the increase of taxes on gold claims.

It will not be out of place to state why foreign capital is not more invested in the mines of Peru. In my opinion it is chiefly owing to the lack of knowledge concerning the place and the requirements for its conditions. The general idea is that the climate is very hot, that it is too far away, that there are too many revolutions there, and that capital is not safe. The truth is that such heat as is felt in Washington and other cities of this country is only felt in Peru in the deepest passes of the mountains, where vegetation is very luxuriant; that New York is nearer Peru than San Francisco; that the much-talked-of revolutions are most of the time but strikes and riots made with the idea of depositing an authority who has burdened the people, and when this end is achieved all is quiet

again. In these strikes or riots foreigners are never interfered with; on the contrary, their persons and property are respected and are held almost sacred in Peru.

Among the many wonders of Peru I will now show you something which may have connection with the mining industry, and perhaps will aid in developing some minerals that, at present, have no commercial value. I was able to obtain only these few samples of natural colored cotton raised in no other place in the world except in the Department of Piura, in the north of Peru. Seeds from these particular plants have given only white cotton when planted in any other region, although having the same climatic conditions. In this region there are many large beds of alum, sulphur, and who knows how many mineral salts, which may tend to give this peculiar coloring to the cotton. It is well worth while for scientific persons to visit the region and investigate which are the minerals that impart the various colors to this cotton, the value of which is three or four times greater than the ordinary cotton. To discover the mineral which imparts this coloring, will be a new triumph for the mining industry.

In conclusion I will add that Peru is not yet a country where common mining laborers can go for business, but any person of good habits having a small capital, can go there and find good labor and cheap, and a heartiness in fulfilling their duty, and all this gives a certainty of increasing capital.

I thought to be able to give much data and many important statistics in regard to my country, but owing to the irregularity of the mails incident to the present conditions in the United States, I have not been able to receive the statistics. Still less was I able to write any notes on my trip of four days from Washington to this great city, as I was unable to draw my eyes away from the grand sights with which nature has endowed your magnificent land, as well as to admire the energy, industry and intelligence of which your vast meadows, farms and fields give ample proof.

I thank you for your kind attention, and in my country's name for your courteous invitation to this Congress of Mines, and I hope that by these conventions we may ripen our plans and all co-operate in whatever may be for our mutual benefit. I also thank most sincerely the kind people of Utah for their cordial hospitality, and assure them of my admiration for their unrivaled progress.

## CONGRESS OF MINES AND METALLURGY—PARIS 1900.

An international congress on questions concerning mines and metallurgy will be held from the 16th to the 23rd of June, 1900, in connection with the Paris Universal Exposition. Like similar reunions at the Paris Expositions of 1873 and 1889, the congress has been organized at the initiative and under the direct patronage of the French Government. In 1878 there were 2000 members; in 1889 more than 600 from all the leading countries in mining industry. For 1900 a great effort is being made to secure a representative assembly of the world's engineers and manufacturers who are interested in the progress of mines and metallurgy.

The members of the congress who will receive all its publications are to be the delegates of French state departments and of foreign governments; donors of at least fifty francs, and the active members, whose subscription has been fixed at twenty francs.

The public sessions will be held in the

afternoon, alternating between questions of mines and of metallurgy. Reports on the questions presented for discussion will be prepared beforehand by engineers of the different countries and distributed to the members of the Congress.

Each morning the members in groups, under the guidance of engineers and manufacturers specially chosen for the purpose, will study in detail the most notable mining and metallurgical exhibits of the different countries in the Exposition. This common study of improvements realized up to date is to aid the work of the congress in preparing the way for further progress.

The organizing committee is particularly anxious to know, at as early a date as possible, the probable number of active members.

The following questions are provisionally indicated as the basis of the final program which will be published when the international organization of the congress is completed:

#### I.—MINES.

1. Use of explosives in mines.
2. Use of electricity.
3. Working conditions at great depths.
4. Means of reducing manual labor in the mining industry.

#### II.—METALLURGY.

1. Progress of iron and steel metallurgy since 1889.
2. Application of electricity to metallurgy.
  - (a) Chemical applications.
  - (b) Mechanical applications.
3. Progress of gold metallurgy.
4. Recent improvements in the mechanical preparation of ores.

The president of the committee of organization is M. Nason de la Groupilliere, director of the Higher National School of Mines. On the committee are represented all the mining and engineering schools, and the principal mining and metallurgical companies of France. The secretary general of the congress is the secretary of the Central Committee of the Coal-works of France—M. Gruner, 33 rue de Chatonniere, Paris.

#### FOREST PROBLEMS.

(BY ABBOTT KINNEY.)

(Continued from our issue of Oct. 1, 1899.)

There is, however, a source of revenue to the government from a rational management of its mountain forest lands, when handled in conjunction with the development by public irrigation works of the vast area of arid public land.

The reason why there is such a large amount of public land in California and in the west generally, is that the land is all in an arid climate, and that it is therefore incapable of supporting a farmer or settler without a secure supply of water for irrigation, and often for domestic use.

The mountain forested areas are all incapable of agriculture in the Southwest. There is consequently no gain of productive area, as in the settlement of Ohio, for instance, by denuding them. On the other hand, these forests are natural reservoirs of the Southwest.

The forests of this section are of the highest importance, both to the irrigation districts already developed, and also to the enormous areas that may by future irrigation works be made fertile.

Storage reservoirs, diversion works, ditches, etc., are all safer and more permanent when under a forested water-shed than when under

a bare one. In the first case, with forest covering, there is a minimum of flood action, and practically no torrential detritus to fill up the works. From a denuded water-shed, the water delivery is irregular, torrential and detritus-laden.

The public land now at its limits, or near its limits of support of population, can, by judicious irrigation works, be made capable of supporting a population of between fifty and one hundred millions. Irrigated land has always been as capable as that for supporting the densest population from agricultural returns. We see this in the history of the Euphrates and the Nile. In both of these cases, and in the more modern developments in India, we see that the important works were carried out by the community or government, were managed by the community, are thus managed, and that new work for further development in the application of water to land in genial and dry climates, such as those of India and Egypt, is planned or being executed solely as government undertakings.

There are three good reasons with us for this policy. The first is that the lands susceptible of improvement are largely public lands. The second is that the undertakings are too large for most private initiative, and the third is that a public administration of irrigated lands is the only one in which the land occupants can feel safe in not becoming serfs of the water company, as is now practically the case in the rich, irrigated valley of the Po, where returns are large, but the people are in misery.

Governments in the past, and governments now, recognize the propriety of making their lands productive by public irrigation works. The peoples who have done this in the past have been among the greatest. One of the most powerful governments of the present day, that of Great Britain, is now, as it long has been, engaged in such irrigation development. The dam on the River Nile, near Assouan, will be the greatest land reclamation work in the world. The values created by the application of water to land in Egypt will far exceed the values created by the exclusion of water from the land in Holland. Both are government undertakings.

In this country the government has undertaken land reclamation by excluding water, as by the Mississippi dykes. It has also added to land-values and product-values by the construction of harbors and canals, thus reducing or removing freight tariffs or lighterage and landing tariffs. The states on, or having rivers, have been benefited by this policy. So also the coast states, or those on the lakes, or served by the great Sault St. Marie Canal, have been benefited; so has the country generally been benefited.

It is eminently proper that the people's government should apply this policy to the development of the rich and sunny western lands that cannot produce and serve mankind without water. In this case the benefit is direct to the public. It is the public land that will be most benefited. It is homes for the people that will be created. It is of course markets and a high productive power population in our own bounds that we thus create. It is the conservative agriculturist that we thus introduce and encourage to balance the more radical bodies of employees in the great manufacturing districts. Fifty million such Americans will consume more American products and support more American trade than all our present foreign trade combined.

Taking the public land area as a whole, we

find some that is inherently worthless, some that can be made good and productive, some where forests and their products can be safely used under reasonable regulations, some where the forests can only be safeguarded, but not used, as in the chaparral mountains of the south, and a wide district that is at present used for pasture. This pasture of the public lands is at present unregulated. The pasture use is premature and excessive. The pastures thus deteriorate and carry less stock.

The public land pastures have deteriorated and are deteriorating in stock and sheep-carrying power. Fighting and disorder is everywhere present among the pasture users. Sometimes they have wars. These stock and sheep men, as far as seen, welcomed a proposed system of leasing the public lands appropriate to pasture, under judicious restriction as to the number of stock permitted on each section and the time of year when the stock should go on. The public lands in California have a present value for pasture that varies with seasons. It is estimated to have an annual rental value of not less than \$250,000, and may exceed half a million dollars. Its rental value varies with the seasonal rainfall. The stockmen would be glad to pay rent, and thus know upon what feed they could rely, without the present accompaniments of murder and arson.

Those districts where pasture injures the water-sheds could have the stock reduced to a safe number by reasonable regulation or entirely removed.

When we consider the importance of the entire forest question, and past and present precedent in the matter of forestry and irrigation; when we consider the effect of forest denudation, in filling up navigable rivers and harbors, the importance of waters to miners, to cities and to irrigators; when we further reflect on the empire at our hand and in our borders to be created by irrigation works, we can agree that forests, reservoirs and public land management all go hand in hand.

The land system as a unit can be self-supporting and revenue producing. All interests can be fairly dealt with, and the country brought to its highest productive power.

Those who engage in promoting this great work have strenuous efforts before them; they deserve the garlands of reward as civic patriots as much or more than those who foment distant foreign wars. The conquest of this empire within our bounds for our own children is more useful, more profitable, more secure and more glorious than any foreign conquests can ever be.

#### CORRESPONDENCE

##### ARIZONA.

KINGMAN, ARIZ., Oct. 5, 1899.

Activity at the Sheeptrail mine is the talk of this section. The 20 stamp mill, with Frue vanners, is ready to begin treating ore, which the bins are full of. A big tunnel is being driven into the mine from the valley below and is now within a short distance of the vein. As soon as the vein is tapped connection will be made with the old workings and all ore will be handled through the tunnel, obviating a two-mile pull up a steep mountain road. The ores are wonderfully rich. At the mill the pulp will be run over plates and concentrators and the tailings cyanided.

The property is located on the Colorado

river, 38 miles above the Needles and 40 miles from Kingman.

The same parties who own the Sheeptrail mines have some property on the east side of the river, in Lincoln county, Nevada. Col. Thomas Ewing is manager of both properties, while the controlling interests are known under different titles. That owning the mines on the Arizona side is the Arizona and New England Mining Company, while that on the Nevada side is the Nevada and New England Mining Company.

The veins on the Nevada side are well defined. They have a tunnel in some 300 feet, and a shaft between 200 and 300 and are now grading for a hoist and another shaft.

When they have their machinery up they will run a tramway from the hoist to the top of a mill they are contemplating building. They will pump the water from the river.

The ledge in the tunnel is seen only on one side where the ledge is about five feet wide.

## UTAH.

(From Our Special Correspondent.)

SALT LAKE CITY, Sept. 30, '99.

The stock market this week was active and sluggish by turns. On every indication of an improvement in prices trading increased. The market is mainly in the hands of professional traders.

Ajax quiet, as were also Anchor, Alliance and Alice. Bullion-Beck lower. Chloride Point continues down, notwithstanding the excellent record being made by the mines and mill.

Daly more active. Daly-West stronger, a dividend is being expected. Dexter stronger and higher. Daisy fairly active at last week's prices.

Eagle and Blue Bell stronger on fair business. Four Aces unchanged. Reports from Geyser-Marion were of an encouraging nature, but the stock remained weak.

Galena quiet. Grand Central has settled down. Ingot lower. Joe Bowers active and unchanged. Nothing new to report on La Reine this week. Work goes steadily on.

Lower Mammoth higher. Little Pittsburg lower. Mammoth active at higher figures. Mercur quiet. The milling capacity is being increased to 600 tons daily. May Day lower.

Northern Light active but without marked change. Ontario higher and active. Petro weakened off at the close, after doing a large business. The Swanses were active at unchanged figures.

Sunbeam strong and active. Sacramento steady and in good demand. Sunshine broke badly. Valeo looks well. Yours respectfully,

P. J. CONWAY.

## WASHINGTON.

(From Our Special Correspondent.)

SPOKANE, WASH., Oct. 7, '99.

Jim Blaine is being developed by means of tunnel on Republic. The drift on third level of Republic will open the Blaine at a depth of 380 feet.

The winze from the drift on the Mt. Lion is down 50 feet at the 320 feet level and values are increasing. About 100 men are now employed. The shaft is being opened at the rate of 5 feet a day. Preparations are being made for stoping out the ore from the 350 foot level. The machinery for the new mill is beginning to arrive. Sufficient ore will be extracted within the next few weeks to run the mill a month or two when the compressor plant will be removed to the site of the mill.

They claim eight feet rich ore in the cross-cut of the Insurgent.

The recent strike in the Lone Pine and Surprise ground assays in value across the face of the drift \$466.40 as an average. The vein is five feet wide. This strike is on the Surprise ground and opens that property to a depth of 100 feet. On the Lone Pine a cross-cut tunnel is being run, but progress is slow as rock is very hard. Not over 14 inches in 24 hours is made.

Arrangements are being made to develop the Tom Thumb property by a system of deep mining. A steam hoist and compressor plant will probably be secured with the other machinery.

The work on the Princess Maud property is going ahead at the rate of 12 inches every 24 hours. The vein is four feet wide and the general average of values taken across the vein is \$100. The values are better diffused through the quartz than when the strike was first made, but do not decrease. Machinery consisting of power drills are contemplated. A shipment to the smelter of the high grade ore is soon to be made.

The stock market opened this week considerably improved. There is a strong call for Quilp and Lone Pine—Surprise. The market is in a very sensitive condition, and a strong call for any stock would most likely advance the price of all. Black Tail is 15 cts., Tom Thumb 17. Morning Glory 11, Lone Pine 25, Jim Blaine 25, Insurgent 6, Golden Harvest 4, are all good purchases now.

THOMAS & NEWCOMB.

## Miscellaneous Mining News.

### ALASKA.

Press dispatches state that Skagway has incorporated her first mining company under the laws of Washington to work what is said to be the second molybdenum mine found on the American continent. The new corporation is the White Pass Mining and Development Company, having a capital stock of \$500,000. Its property consists of a lode of molybdenum about one foot wide, discovered nearly a thousand feet below the White Pass Railroad tunnel. This lode of remarkably pure molybdenum is found in a mineralized ledge varying from five to eight feet wide, which has been uncovered for 800 feet, and ore from this assayed \$53.73 in gold and silver.

One of the agents of Vivian & Co., owners of the great metal refinery at Swansea, Wales, was at Skagway five weeks ago and offered to purchase all the molybdenum that could be delivered at Seattle, Wash., for his firm. It was this definite offer that led to the incorporation of the company, which will begin shipments at once. The value of molybdenum is nearly double that of silver. The only other known molybdenum mine in this country was discovered last spring on the south shore of Lake Chelan, in the Okanogan country. The vein there is located high up on a precipitous mountain side, where miners are being let down from above with ropes to drive a tunnel for standing room. This mine also will soon be shipping ore.

### ARIZONA.

#### Gun Creek District.

Frank Trego, who some time since bonded the Morris & Hocker claim and two claims

from the Schell boys on Gun creek for \$45,000, is driving a tunnel which is now in 130 feet and will be 300 feet in length when completed.

Gowan & Pranty have one of the best claims in the Black Warrior, says the *Silver Bell*, which adjoins the Gun Creek mine. They are down 130 feet and have crosscut the ledge about thirty feet, all in ore carrying good values in copper, gold and silver. The Gowan & Pranty ledge is sixty or seventy feet wide, carrying copper mostly and running through the center of the ledge is a twelve-foot vein of gold ore assaying \$40 to the ton.

Robert Schell and Sons have a group of claims at the mouth of Gun creek, which rumor says have been bonded for \$100,000.

A. D. and D. R. Williamson and Frank Miller have located eight claims, one of which, adjoining the Erie mine, is a very promising prospect. The iron capping on this claim is from fifty to sixty feet wide, and at a depth of ten feet the ore carries eight per cent copper. The Williamson brothers will leave tomorrow morning for Gun creek, with tools and supplies for the purpose of sinking a fifty-foot shaft on this claim.

The management of the White Hills Mining and Milling Company has recently received a general shaking up and the principal office of this important company has been moved from Denver to Colorado Springs.

This is part of the good work which Mr. William Weston has been doing in London during his stay there. Mr. Weston is consulting engineer for the company. Mr. G. B. Wilcox of the law firm of Lunt, Brooks & Wilcox of Denver, has been elected president and secretary and the banking house of William P. Bonbright & Co. has been appointed treasurer.

The White Hills Company is a very big concern and is operating in the White Hills, Mohave county, Arizona. The company owns no less than forty-four patented claims, and thirty more that are as yet unpatented. From some of these properties some of the very richest ore ever discovered anywhere has been produced and shipped. Some of the properties, however, return good gold values.

The company's payroll amounts to from \$8,000 to \$10,000 per month, and, as is indicated by this statement, a very large force of men is employed.

Besides its mining property and very full equipment, the company also owns valuable water rights, a twenty-stamp mill, telegraph and telephone lines, boarding houses and store, and is, in fact, one of the biggest going mining concerns in Arizona.

Mr. G. B. Wilcox, in company with Mr. J. D. Murphy, Mr. Weston's head assistant, has gone to the mine, where they will stay several weeks.

## CALIFORNIA.

#### AMADOR COUNTY.

The managers of the Hepburn mine at Jackson are arranging to begin development operations. The hoist and engine are being overhauled and repaired and a bulkhead is to be constructed in the drift to hold back the water in order that sinking may be facilitated.

#### CALAVERAS COUNTY. Strike at the Demarest.

The monthly clean-up at the Demarest mine, near San Andreas, was made last week and proved very satisfactory. It netted about

\$2500, which is very good for a thirty days' run with a five-stamp mill. There is an unconfirmable rumor that another rich strike has been made in the 400-foot level of the Demarest. This lead is said to be richer than any yet struck in the mine, and is reported as being five feet wide. There is no doubt that the Demarest is a good mine.

The 1600-foot level has been reached in the shaft at the Gwin mine at Middle Bar, and a sump is being sunk below that. Crosscutting and drifting either have been or will be inaugurated at the 1600-foot level and at the 1200-foot level. At the 1200-foot level an effort will be made to find the ledge encountered in the recent sinking, and which had never before been encountered in the property, at least since its reopening. The new forty stamps were ready to operate the 1st of October, and were expected to be started up soon thereafter, the old mill being shut down for repairs until some time about the commencement of the coming year, when the eighty stamps will be started up.

#### INYO COUNTY.

Superintendent Hoskins, of the Reward, was in Independence. He reports matters running along as usual. The cyanide plant is working very satisfactorily.

Messrs. Cohen and Oxnam, mining experts for Capt. De La Mar, made a visit to Independence, for the purpose of examining the Barnes & Anderson mines. They brought in a number of pieces of beautiful specimen rock. At one point in the Alhambra the vein is twenty inches wide, and there is a seam in it five inches wide, that is alive with gold, running well up into the thousands. The main ore body, upon which most of the development work has been done, is four feet wide, and will mill over sixty dollars per ton. Mr. Oxnam and Geo. Montgomery left for Saline and will go to Ballarat before returning. Mr. Cohen returns to San Francisco shortly.—*Inyo Independent*.

#### KERN COUNTY.

##### Randsburg Notes.

The Yellow Aster Gold Mining Co. of Randsburg are having abstracts of twenty-three claims made and will apply for United States patents.

The Black Hawk has started in on a stope 85x50 from the second level, 130 feet. The quartz will average at a good figure.

The Standford is now drifting at the 150-foot level and are also taking out ore from a raise in the 100 foot level, at the end of a 90-foot drift that will run \$40 to the ton.

The Red Dog mill had another busy and successful week, having milled sixty tons of ore for the Baltic, some twenty tons from the Napoleon, and ten tons from the Omega, is a portion of the ore milled by this mill.—*Randsburg Miner*.

#### MARIPOSA COUNTY.

##### The Grant.

Not for over a quarter of a century past has the Mariposa Grant had such a promising outlook as at present.

The new company that have taken hold of the Grant evidently mean business. They are no grass root miners and have taken hold with the determination to go down into the earth and delve for the treasures that lie hidden there.

Some time ago work was commenced in Mariposa by the company. Wm. Dodge is

the foreman and Thomas Dale is the night boss. Men were employed in grading and cleaning the old roads to the mine and grading for a blacksmith shop and other buildings. The lower tunnel is to be cleaned out and re-timbered and track put in.

So far, Princeton has made the greatest improvement. Miners are already working in the old shaft; they are down a vertical distance of 68 feet, and from there on an incline about 30 feet further down, making a total of about 98 feet.

Joseph Thomas, formerly of Nevada City, is in charge at Princeton.

Just back of the old town of Princeton the company have almost completed a warehouse seventy-five feet in length by thirty feet in width. The foundation of the sleeping house or bunk house, as it is more commonly called, is already laid and is one hundred and twenty feet in length by thirty feet in width.

The foundation for the dining room is nearly completed and is 60 feet long by 30 feet wide.

The headquarters of the company is to be at Princeton, and shortly residences for the manager and different officers of the company will be erected there.

At Bear Valley there are the Pine Tree and Josephine mines that have been worked years ago, and are known wherever the Grant is known or spoken of. About twenty men are employed in these mines at present, under the management of A. H. Pearce.

The lower or blacksmith shop tunnel on the Pine Tree has been cleaned out to a distance of 575 feet, and they are going steadily ahead with the work which they will continue to the old shaft which is in about 750 feet. This shaft is sunk 250 feet below the tunnel level. The present intention is to continue the shaft down so as to connect with the Benton Mill tunnel, which will be driven ahead.

At the Josephine two lateral drifts will be run, one south from crosscut No. 2 and one north from crosscut No. 1.

The whole working of the Grant is under the direct management of Manager Mackenzie, who is kept quite busy.—*Mariposa Gazette*.

#### RIVERSIDE COUNTY.

The *Riverside Enterprise* says that the North Hemet group of mines in the Cahuilla district, which were purchased some weeks ago of Riverside parties by Denver people, bid fair to be the center of a very lively mining camp this winter. It is understood that the company has made contracts with various parties to do the hauling of lumber, machinery, pipe and other supplies to the scene of the mines, which is a strong indication that active work is soon to commence there. Recently the company owning the mines has had them surveyed, and a party who is in a position to know says that vigorous work will be in progress there in a very short time. He says that the company has shown by steps so far taken that it is the intention to thoroughly open up and test the mines, and this will mean the expenditure of a large amount of money.

#### TUOLUMNE COUNTY.

The Rawhide and App mines closed down recently owing to the failure of the water supply. By these suspensions 130 men are thrown out of employment.

At the Star a small force is engaged in doing development work. This really good property depends upon water entirely for

power, but will soon have on it a big steam plant, so that operations can be prosecuted full handed the entire year.

The machines in the Republican mine were stopped last week and sinking continued by hand drilling. This step was made necessary owing to a lack of sufficient water with which to drive the compressors. The shaft is down 350 feet.

The Providence mill, which is operated by steam, manages to keep ten stamps dropping at night by securing enough water for battery purposes from the Grizzly, the mill of which crushes only during the day-time, hanging up at night in favor of its neighbor.—*Union-Democrat*.

#### COLORADO.

##### Gilpin Notes.

Drifting is being carried on in the 425-foot level east on the Robert Emmet. The road to the mine has been repaired and put in good condition.

The Unexpected mine on Bobtail hill has been started up by a Black Hawk pool and the work of drifting is being carried on at the 160 and 265-foot levels.

Manager S. S. Johnson is pushing development work at the Lotus mine in the Russell district. The principal work being done is drifting. He is also hoisting about ten tons of ore per day.

B. S. Phillips of the Egyptian mine on Quartz hill is now at work cleaning out the 600 and 700-foot levels. All levels above these have been cleaned out and put in shape for working.

Work is in progress cleaning out the shaft and drifts at the Hayes and Wheeler mine on Quartz hill. All were found to be badly caved. The shaft will be retimbered and put in good shape.

J. A. Bostwick has reached a depth of 210 feet in the shaft of the Clark-Gardiner mine on Quartz hill. In some places the shaft was badly caved and it took considerable work to put it in shape.

##### Notes from Chaffee.

Horace Ennels has opened a fine four-foot vein on the Queen Ester in Heron Park, at a depth of fifty feet. This property has long been one of the most prominent in that section.

J. H. Zillhaver has bonded and leased his iron property six miles north of Cotopaxi to the Argentine Smelting Company of Kansas City for \$15,000. Mr. Zillhaver will have charge of the property and will begin work at once with a force of men. In addition to the lease Mr. Zillhaver is paid a royalty on all ore taken out.

Everything is moving right along in Turner. The Gold Bug leasers are hard at work. The Anaconda people are working steadily notwithstanding the fact that Dr. Bancroft has gone east to get a steam hoist with which he can work to a better advantage. Mr. Davenport has a piece of ore which recently came from that claim, which bears a strong resemblance to ore taken from the Little Johnny, at a depth of 1,000 feet.

#### IDAHO.

When work was resumed on the Mammoth after the Wardner riot, it was only at the mine, nothing more being done with the long crosscut tunnel until this week. The compressor has been run steadily from the time it

was first started last fall until the 1st of May, so before starting it again, it was all taken apart and overhauled. At the same time a pipe line was laid over the hill, from the compressor to the No. 2 tunnel and down through the stopes to the level of No. 4, where two machines will be running in a few days.

The French Creek Mining and Development Company, Ltd., filed articles of incorporation with the Shoshone County Recorder. H. L. Gray, Ellis Small, A. Anderson, C. A. Parkin and Fred H. Wood are the incorporators. The capital stock of the company is \$2,500,000, divided into the same number of shares. The incorporators, together with A. A. Meaham and M. M. Hobart, both of Cleveland, Ohio, are the directors. The principal place of business is French creek.

The Panhandle Mining and Milling Company, Ltd., filed articles of incorporation with the Recorder of Shoshone county. Albert Burch, Geo. W. Harris, Wm. T. Hales, Alex. T. Nichols and Chas. H. Wentz are the incorporators. Wardner is named as the principal place of business. The capital stock is \$100,000, divided into 1,000,000 shares, 700,000 of which are subscribed by the incorporators, the remaining 300,000 being held as treasury stock. The purpose of the company is to work the Panhandle group up Nine Mile.

## MICHIGAN.

Michigan has done a little something in the way of coal mining for many years, but it has not been until the past few that anything like a satisfactory output has been made, or one showing that there is a chance to make money from the mining of the coal seams of the state, says *Iron Ore*.

The production of the mines in the state in tons for the present year is as follows:

|                    |         |
|--------------------|---------|
| Bay Mining Co      | 48,858  |
| Corunna Coal Co.   | 50,000  |
| Grand Ledge mines  | 4,000   |
| Jackson mines      | 65,000  |
| Monitor Coal Co.   | 45,601  |
| Saginaw Coal Co.   | 80,515  |
| Sebewaing Coal Co. | 15,550  |
| Somers Coal Co.    | 50,000  |
| Standard Coal Co   | 12,012  |
| Verne Coal Co      | 6,000   |
| Total              | 378,541 |

## Gogebic Range.

Lake shipments of Gogebic range ores for the past week present a sickly appearance in print. This week's record, however, will be quite otherwise.

There is nothing new to report regarding the transfer of the Aurora mine to the Oliver Mining Co. Operations at the property are still being carried on by the Aurora Co.

Two steam shovels are loading from stockpiles at the Norrie—one at No. 6 and the other at No. 7. The stockpile at No. 1 and 2 East Norrie is full of frost, necessitating the shaking of the piles with dynamite.

Mr. Curry is carrying on exploration of the right sort at the Bourne property, west of Gile. A north vein of encouraging size has been opened up, and a crosscut is being driven south to locate the footwall. A small lens of good ore has been encountered in the crosscut.

## MONTANA.

### Neihart Items.

William Eccleston, Charles Stroup and Charles Black, who have a lease on the Benton group, struck good ore the first of the week, and in a short time expect to be making some rich shipments of the ore.

A lease of the O'Brien mine has been made to Robert Hunt, George Pattengale and John Drinville, and they have begun work.

The Florence Mining Company has been busy during the week cleaning up the ravages of the fire and will start work getting out ore as soon as possible.

M. S. Paisley, William Stark and George Moore shipped two cars of ore to Great Falls recently from their lease on the Benton mine. The returns are said to have been very satisfactory.

W. S. Soule and Robert Parry have received ore samples from the claims at Salmon City, Idaho, in which they are interested. All of them run very high in gold. They have a half interest in two claims covering 3,000 feet of the vein and expect to make a good thing from it. The work is under the supervision of Charles Soule, an old Neihart boy, and he has a tunnel for 100 feet of the distance.

J. L. Neihart, Thomas Westgard and Henry Sutton have returned from the Middle Fork, where they have been doing development work. They are very much encouraged and will begin the shipment of ore this fall. The ore carries 50 per cent of lead and 30 ounces of silver. Neihart on this last trip located another claim at the bottom of a 10-foot shaft and located some good copper ore.—*Anaconda Standard*.

## NEW MEXICO.

### Grant County Not s.

J. W. Bible has 18 men mining and shipping "Black Jack" from the Thunderbolt.

A shipment from the Humboldt is estimated to run 18 per cent copper and 40 per cent excess in iron.

The Little Fannie will soon be working with a new hoisting plant.

Bennett, Allen & Carmichael are working placer dirt with good results in the San Domingo gulch.

Work on the Granite Gap group of mines at Stein's Pass is being done on a large scale. Twenty-five men are employed and high grade ore is being shipped as fast as it can be loaded on the cars.

The Hutchinson mine, near the Hanover, has been sold for \$12,000.

Ore bodies in the Rattler group at Hanover, owned by Colorado Springs parties, equal the greatest expectations of the operators.

The Bennett group is making a fine showing as development progresses.

The Worthen group on the west side of Burro mountains has been sold.

The mine recently located near Lordsburg by Jeremiah Urie, of El Paso, and now owned by the El Paso Mining Company, has commenced shipping ore. The ore assays \$50 per ton. There are eight stockholders in the company, and so far only \$480 has been expended on the property.—*N. M. Mining Record*.

The Lone Star Mining Company, near Bland, has a force of about twenty men at work in the several levels of their property. A few contracts have been let recently and

are being worked by double shifts with good results. Over twelve hundred feet of development work has been performed on this property. Rock is being broken in each of the six levels and that which is not treated at the Bland mill is piled upon the dump. None of the ore is sorted, but is run through the mill as it comes from the mine, and will assay nearly \$20 on the average. It is not known what the extent of the ore body is, but practical mining men say it is safe to estimate it at from 100 to 125 feet between walls.

## OREGON.

Mr. W. A. Dunn, owner of the Yankee Boy group of mines at Quartzburg, Grant county has recently taken out some rich ore specimens of which attracted a great deal of attention in Baker City.

The specimens were taken from a rich pay streak in the Yankee Boy, one of which was a solid piece of gold separated from quartz.

Mr. Dunn also showed some fine copper specimens from a ledge that crosses the gold veins of the group. The copper vein is 40 feet wide, with solid bodies of copper ore from 3 to 4 feet wide running through it. Assays of the ore gave a return of 40 per cent copper.

Mr. Dunn is shipping a car load of this gold ore to Denver.

The English syndicate that recently bonded the White Elephant mine, adjoining the Bonanza on the west, from Henry Saulsbury and others for \$15,000 have reason to congratulate themselves on a most fortunate development.

In going five feet after the new owners took charge, workmen pursuing exploiting on what appeared to be genuine barren bull quartz, opened up ore showing free gold clear across the ledge. The ledge is said to be about 9 feet wide.

The mine is in charge of Mr. Henry Cabel, and from all reports the English investors have a good thing.—*Baker City Democrat*.

## SOUTH DAKOTA.

The Boston and South Dakota Company has nearly completed the remodeling and repairing of the old Minerva stamp mill in Blacktail gulch, of the Black Hills, and this old mine will soon be taking out ore. The mill was built for 40 stamps, only 20 being placed at the time it was built. The old 20 stamp mill which stood near the Iron Hill mine, in Carbonate camp, has been purchased, and it is being hauled down to the Minerva mill. This will give the Minerva mill 40 stamps.

The Golden Reward Mining Company has commenced clearing away the debris from the burned chlorination plant in the First Ward of Deadwood, and the work of reconstructing the plant will commence just as soon as the material can arrive from the east. The new plant is to be larger in every way and will be fire-proof. The addition of the cyanide process to the chlorinating process will give the company a way of treating all of its ores in its own plants. The smelter is running full capacity and all of the miners in the Bald Mountain district, who were laid off when the chlorination works burned, have been taken back again, and the usual amount of ore is being treated every day. Preparations are going on by the company to start up the old Two Bears mine, in the Strawberry gulch district.—*Black Hills Mining Review*.

## TEXAS.

## Texas Export Minerals.

Texas is not in shape to do much in developing a foreign trade with her mines. Other states like Missouri furnish such of the products of the mines as are sent through Galveston. Colorado furnishes considerable lead, and with the establishment of regular services and proper protection it may be that some business in the shipment of gold and silver can be done. A small quantity of silver was shipped from Galveston to Belgium last season. Spelter and zinc ore come from Missouri, and it will be noted that this trade has had a large increase during the season over any previous season. It has been only since deep water was secured that any business could be done in these metals, as the best that could be done was to get a partial cargo of cotton into a vessel and lighter her outside.

In regard to the manufactures of metals, old iron and steel rails for Italy have comprised the bulk of the shipments. Mexico has been a fair customer for brass, but shiploads of old rails have gone to Italy. Mexico has taken a good deal of structural iron for the building of the harbor at Vera Cruz and other places, and for railroad bridges.

## ORES AND MINERALS.

|                      | Pounds     | Value     |
|----------------------|------------|-----------|
| Sulphate of copper—  |            |           |
| Mexico               | 1,729,525  | \$63,887  |
| France               | 247,501    | 13,614    |
| Spelter—Netherlands  | 375,153    | 18,757    |
| England              | 7,130,405  | 382,365   |
| Belgium              | 1,128,666  | 56,433    |
| Germany              | 5,214      | 200       |
| Zinc ore—Netherlands | 204,320    | 3,525     |
| England              | 113,240    | 1,479     |
| Total, 1898-99       | 13,394,024 | \$540,260 |
| Total, 1897-98       | 8,156,962  | 370,771   |
| Total, 1896-97       | 17,772,267 | 889,982   |

## METAL MANUFACTURES.

|                |         |
|----------------|---------|
| Brass—Mexico   | \$ 467  |
| Germany        | 650     |
| Total, 1898-99 | \$1,117 |
| Total, 1897-98 | 110     |
| Total, 1896-97 | 5       |

|                       |           |
|-----------------------|-----------|
| Steel—Colombia        | \$ 41     |
| Mexico                | 5,179     |
| Iron and Steel—Mexico | 37,624    |
| Italy                 | 111,495   |
| Colombia              | 275       |
| Cuba                  | 20        |
| Total, 1898-99        | \$154,634 |
| Total, 1897-98        | 10,294    |
| Total, 1896-97        | 21,658    |
| Total, 1895-96        | 58        |
| Total, 1894-95        | 354       |

|                |        |
|----------------|--------|
| Tin—Mexico     | \$ 118 |
| Cuba           | 6      |
| Total, 1898-99 | 124    |
| Total, 1895-96 | 10     |

|                 |       |
|-----------------|-------|
| Copper—Colombia | \$144 |
|-----------------|-------|

## UTAH.

The battle between the Grand Central and Mammoth Mining Companies of the Tintic district has been opened in earnest.

From sources perfectly reliable it has been

learned that all the papers have been prepared and the plan of campaign against the defendant company outlined. The plaintiffs will set up a claim that the Mammoth Mining Company has extracted ore in the past and is extracting ore now from Grand Central ground, and will ask that an injunction be granted. It is understood that the Grand Central will also demand something like \$250,000 in payment for the ore which they allege has been taken out of their ground.

The launching of the suit is greatly deplored by mining men in general. It was hoped that the differences that have existed for some time between the two Tintic corporations might be settled amicably instead of resorting to litigation that is likely to last for several years, and which is sure to cost both companies an enormous lot of money.

## FOREIGN MINING NEWS

## BRITISH COLUMBIA.

Shipments from Rossland during 1899 have been very satisfactory, notwithstanding a number of the mines have been closed on account of one cause or another, such as installing new machinery, etc. The shipments for the year have been:

| MINE.             | TONS.     |
|-------------------|-----------|
| Le Roi            | 58,271.5  |
| War Eagle         | 34,626.5  |
| Iron Mask         | 2,739     |
| Evening Star      | 737       |
| Deer Park         | 18        |
| Centre Star       | 6,157     |
| Columbia-Kootenay | 31.5      |
| Total             | 102,580.5 |

The Philadelphia Mining Company has bought land near the Butte mills, six miles below Rossland, B. C., on the Northport road, and is engaged in building a fifty-ton concentrator. The distance from the concentrator to the mine is less than two miles. Three carloads of machinery have been ordered, and are expected by the time the buildings are ready to receive it. It is claimed by the owner of the mine, the Mountain Trail, that they have abundance of concentrating ore.

## MEXICO.

A new eighty-stamp mill, to cost \$200,000, will be erected at the Esperanza mines, El Oro. Esperanza shares are now quoted at \$1600.

Walter Carrington, who has for some time been in charge of the Santa Ana mine, at Huautla, Morelos, was in Mexico last month. He says there have been no new discoveries of late in that district, but that the new hoisting machinery is now in operation at the Santa Ana.

F. B. Burness, of Siloa, is interested in Huilota, 12 miles from Guanajuato, yielding gold and silver, which is gradually developing, says *Modern Mexico*. He reports the new 20-stamp mill, which is being erected at Guanajuato by an English syndicate, as almost completed.

The Cuchilla gold mine, near Altar, Sonora, has been bought by California parties for \$20,000. Another deal at the same place was the sale of a fine gold proposition by Sr. J. J. Pompa for \$17,000. The Calera, also of gold, Magdalena, is in treaty for \$60,000, and a New York syndicate is reported to have bought the Copita copper mine for \$3,000,000.

## PERSONAL NEWS ITEMS

J. F. COLEMAN, who is developing the Mammoth copper mines at Kennett, Cal., left for New York this week.

C. C. DERBY, superintendent of the New Almaden, Cal., mine, is visiting in San Francisco, Cal.

T. CLARK left Placerville, Cal., this week for Colombia, South America, to superintend the Playa De Oro mine.

J. D. KENDALL, of Berwick & Moering, of London, has left for England. He will return to British Columbia after a short absence.

CHARLES E. STUBBS, a prominent mining man from Colorado Springs, is in Deadwood, S. D., and will spend several days in looking over the resources of the district.

The superintendent of the Baltimore & Deadwood Mining Company, MR. GROVERMAN, returned recently from Chicago, where he has been attending to company business. He has a force of men at work upon the addition to the mill at Gayville, and the foundation will be completed within a few days.

GEORGE M. THRESHER, who is one of the stockholders in the Detroit & Deadwood Mining Company, arrived there last week and is inspecting the different properties owned by his company. He is accompanied by the secretary, MR. R. H. MURRAY.

JAS. A. CUNNINGHAM of the Bullion-Beck mine, Utah, is in New York City on business.

J. IRVING CROWELL, manager of the properties at Copper City, Cal., who has just returned to Los Angeles, Cal., from a trip to the Atlantic coast, says that while away he invested \$10,000 in a plant for extracting copper from the ore by the leaching process. It is expected in a short time and will be immediately installed at their mines. They have recently developed considerable water.

A. EKMAN, in charge of the mining department, California Paris Exposition, made an official visit this week to Shasta county, Cal.

J. H. MILLZNER, a mining man of Prescott, Ariz., is in San Francisco.

W. J. O'DONNELL, of Shasta, Cal., is field deputy of the California Paris Exposition Commission for collection of ores of Shasta, Siskiyou and Humboldt counties.

FRED. S. HARRIS, mining engineer of Guadaljara, Jalisco, Mexico, is in Chicago at present.

S. F. EMMONS, department of Economics, U. S. Geological Survey, has returned to Washington, D. C., from an extended observation through Montana, Utah and Colorado.

W. B. ANDREW is again in Salt Lake City, after an absence of 6 weeks in the east on mining business.

H. H. HUNTER, who negotiated the transfer of the Afterthought copper mine, near Redding, Cal., is in San Francisco to complete the sale of the property. Salt Lake and Butte capitalists are the purchasers.

HERMAN UNZICKER, long connected with the Edw. P. Allis Company, of Milwaukee, Wis., is now with Fraser & Chalmers, Chicago.

J. A. FERSON, of Madera, is superintendent of the mines of the California Copper Company, at Dalton, Madera county, California. H. B. Nicholls, of the Selby Smelting Works, will be superintendent at the smelter. F. F. Sharpless is general manager, with office headquarters at Madera, Cal.

R. J. DYAS, of St. Louis, Mo., who is interested in mining properties on the Colorado River, was in Los Angeles, Cal., recently.

J. H. MEANS, who has been a field assistant to the State Mineralogist of California for several years, and who is a graduate of the University of Indiana, has accepted a position in the interior of China, with Moring & Co. of London, large mining operators, at a salary of \$4000 and expenses. Mr. Means joins H. C. Hoover, also formerly of San Francisco, who has been in China for some time past.

GEO. J. ROCKWELL, metallurgist for Fraser & Chalmers, of Chicago, has been examining gold mines in Hidalgo, Mexico, for a few weeks past.

PROF. L. L. DYCHE, of the University of Kansas, is in San Francisco, Cal. He has been making a study of the large living mammals of the Pacific coast, and has recently given attention to the seals and sea lions. During the week he has delivered two lectures under the auspices of the Academy of Sciences.

# The Mining And Metallurgical Journal

## THE MARKETS.

All quotations, financial reports and other statistical figures given under this head are New York Quotations, unless otherwise stated in each item. These figures are carefully revised each issue, and constitute a very accurate compilation of statistical matter.

### METALS.

NEW YORK, Oct. 14th, 1899.

The following are the Silver, Copper and Lead quotations for the last two weeks:

|        | SILVER. | COPPER. | LEAD |
|--------|---------|---------|------|
| Oct. 2 | 59      | 18 50   | 4 60 |
| " 3    | 59      | 18 50   | 4 60 |
| " 4    | 59      | 18 50   | 4 60 |
| " 5    | 59      | 18 50   | 4 60 |
| " 6    | 59      | 18 50   | 4 60 |
| " 7    | 59      | 18 50   | 4 60 |
| " 8    | 59      | 18 50   | 4 60 |
| " 9    | 59      | 18 50   | 4 60 |
| " 10   | 59      | 18 50   | 4 60 |
| " 11   | 59      | 18 50   | 4 60 |
| " 12   | 59      | 18 50   | 4 60 |
| " 13   | 59      | 18 50   | 4 60 |
| " 14   | 59      | 18 50   | 4 60 |

### SILVER.

The silver market has a slight receding tendency. Absorption of silver by the Orient is hardly sufficient to sustain the market without Continental orders.

### COPPER.

The market continues very strong, consumption is very large in all branches for this season of the year. Lake copper is offered at 18 1/2c. We quote for electrolytic in cakes, wirebars or ingots, 17 1/2c. at 17 1/4c., while casting copper is nominal at about 17 1/4c. at 17 1/2c.

**LEAD.**  
The demand for lead at this season of the year is, as usual, very large. Prices have advanced somewhat and the metal is now quoted at 4.55@4.60. The foreign market is firmer and a good business has been done for export. Spanish lead is being quoted at £14 10s. @ £14 11s 3d.; English lead is quoted at 5s. higher.

### SPELTER.

The lower prices have attracted considerable attention and we hear of numerous transactions. Consumers generally are poorly covered, and with a large consumption in sight for the fall months a betterment in value is looked for. New York is quoted at 5.80c., while the foreign market has declined to £23 10s. for good ordinarie and £23 10s. for specimens.

### ANTIMONY.

Antimony is quiet and steady at 10 1/2c. @ 11c. for Cookson's; 9 1/2c. for Hallett's, U. S., Star and Hungarian.

### NICKEL.

Nickel continues unchanged and no alteration of prices can be reported. We quote for ton lots 33@36c. per lb., and for smaller orders 35 1/2@38c. London prices are 14@16d. per lb., according to size of order.

### TIN.

The London market fluctuated considerably during the past week, but closed £142 5s for spot and £143 5s. for three months prompt. New York is quoted at 31 1/2c.

### PLATINUM.

The demand for Platinum is active and prices continue high. New York is quoted

\$15.50 per ounce for large lots and \$16@17 for smaller orders. The London quotation is 62@64s an ounce.

### POTASSIUM CYANIDE.

Purified, 98@99 per cent., in cases of 120 lb. at 30c. per lb. in 5, 10, 25 and 50 lb. tins at an advance.

### QUICKSILVER.

The wholesale price in New York has advanced \$1 and is now \$46.50 per flask. The London price has risen to £8 10s. per flask, with the same rate from second hands.

### THE MINOR METALS.

Quotations are given below for New York delivery:

| Aluminum:                           | 35@37c      |
|-------------------------------------|-------------|
| No. 1, 99 per cent. ingots, per lb. | 31@34c      |
| " 2, 99 "                           | 35c. up     |
| Rolled sheets, per lb.              | 35c. up     |
| Aluminum—Nickel per lb.             | 33@39c      |
| Alum-bromide.                       | 20@23c      |
| Bismuth, per lb.                    | \$1.45@1.50 |
| Phosphorus, per lb.                 | 48@50c      |
| Magnesium.                          | \$2.75@3.00 |
| Tungsten, per lb.                   | 70c         |
| Tungsten-tungsten, 60 per cent.     | 80c         |

Variations in price depend chiefly on the size of the order.

### ACIDS.

Prices show no change and there is only a moderate business doing. Some inquiries for sulphuric acid are reported.

Blue vitriol continues rather unsettled and offerings are again said to have been made a shade below quotations.

There is some excitement in copperas, offerings of large quantities having been made by agents in New York repre-

senting a new producer whose identity is not disclosed. The works are said to be near Pittsburg.

### BRIMSTONE.

The market is uneventful. Demand continues fair and prices unchanged. Spot best unmixed seconds can be had at \$21.75 @ \$22.00 per ton, and shipments at \$20.0 @ \$20.75, while thirds are from \$1.75 @ \$2.00 less.

### NITRATE OF SODA.

There is still some talk of higher prices but dealers continue to take orders at \$1.57 1/2 @ \$1.92 1/2 per 100 lbs., while spot stock is offering at \$1.90 @ \$1.62 1/2 and one or two large sellers ask \$1.65 per 100 lbs.

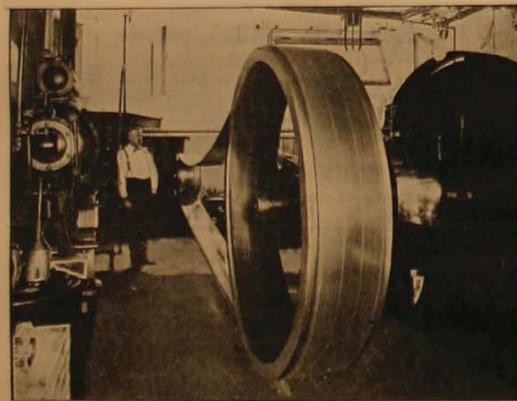
### CHEMICALS

In domestic high test alkali large sales are made for next fire at 72 1/2c. per 100 lbs. f. o. b. works; for prompt delivery second hands are asking up to 95c. Caustic soda, domestic, is small in supply, hence higher prices are quoted. Soda shows renewed competition among makers and lower prices are expected.

Caustic soda high test is quoted per 100 lbs. f. o. b. works at 72 1/2@75c. in New York, 85@90c. while foreign brands are quoted at 67@70c. Bi-carbonate of soda is quoted per 100 lbs. f. o. b. works, 1.12 1/2@2.25. Chlorate of potash crystals in New York are quoted for domestic, 9.00@9.25; foreign, 9.25@9.37 1/2; powdered domestic at 9.25@9.50, and foreign, 9.50@9.75.

### CHLORIDE OF LIME.

English prime brands are quoted at 1.50@1.55 with 1.40@1.50 for other brands.



BROWN, DURRELL & CO.

CLING-SURFACE MFG. CO.,

BUFFALO, N. Y.

BOSTON, MASS., Aug. 1, 1899.

DEAR SIR:—Having tried Cling-Surface on my 12" dynamo belt (16 feet between centres), I have been able to carry full load with 22" sag on belt with no perceptible slip. It surpasses my expectations and I can recommend it to do all that is claimed for it, if directions are followed.

Yours respectfully,

E. B. PRESCOTT, Engineer.

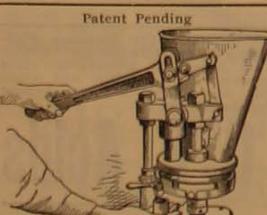
Four months ago this Belt was as tight as a fiddle string, under about 1000 lbs. initial tension and yet was slipping. There is no slip now for it runs slack. CLING-SURFACE did it.

CLING-SURFACE MANF. CO.,

167-172 VIRGINIA ST.

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Represented in Salt Lake City by the  
UTAH RUBBER & MANF. CO.



### Perfect Cupels

Can be made by anyone with ease and dispatch with

### Calkins' Cupel Machines

Compact, easily operated, can't get out of order, everlasting.

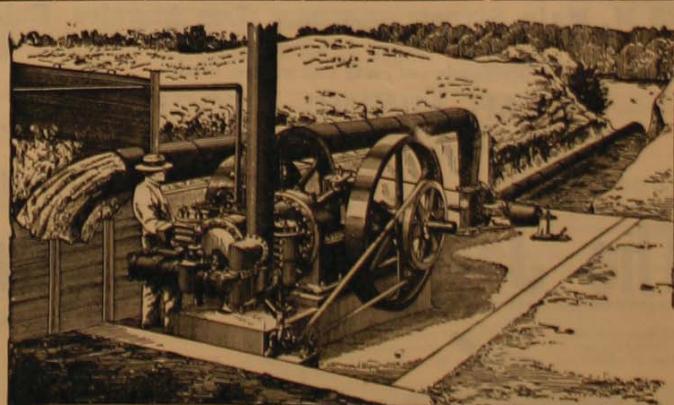
No Assay Office Complete without one.

Descriptive pamphlet and price list mailed on application.

F. W. BRAUN & CO., Assayers Goods of every Description.  
LOS ANGELES, CAL.

The Automatic. This machine will make five sizes cupels of ideal perfection. Capacity 600 an hour. Three designs and grades.

**RIVETED SHEET STEEL WATER PIPE**  
For Placers, Water Powers, Irrigation, Etc.  
**THE WEIGLE PIPE WORKS**  
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### 3 LARGEST GASOLINE PUMPING PLANT IN THE WORLD

The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works in the Packer Ranch, Colusa Co. 80 h. p. Hercules Engines, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 200 h. p. Send for Catalogue. HERCULES GAS ENGINE WORKS, 216 Bay St., San Francisco.

## FINANCIAL NOTES.

## AVERAGE PRICES OF METALS.

in New York per 100 lbs. from January 1st, 1899:

| Month     | Copper | Tin   | Lead | Spelter |
|-----------|--------|-------|------|---------|
| January   | 14.75  | 22.48 | 4.18 | 5.34    |
| February  | 18.50  | 24.20 | 4.49 | 6.28    |
| March     | 17.54  | 23.82 | 4.37 | 6.31    |
| April     | 18.03  | 24.08 | 4.37 | 6.67    |
| May       | 18.25  | 25.76 | 4.44 | 6.68    |
| June      | 17.93  | 25.85 | 4.42 | 5.98    |
| July      | 18.33  | 29.03 | 4.52 | 5.82    |
| August    | 18.50  | 31.53 | 4.57 | 5.65    |
| September |        |       |      |         |
| October   |        |       |      |         |
| November  |        |       |      |         |
| December  |        |       |      |         |
| Average   |        |       |      |         |

## AVERAGE MONTHLY PRICES OF SILVER.

In New York per ounce Troy, from January 1st, 1899, and for the years 1898 and 1897:

| Month     | 1899  | 1898  | 1897  |
|-----------|-------|-------|-------|
| January   | 59.36 | 56.77 | 64.79 |
| February  | 59.42 | 56.07 | 64.67 |
| March     | 59.64 | 54.90 | 63.06 |
| April     | 61.10 | 56.02 | 61.85 |
| May       | 61.23 | 56.98 | 60.42 |
| June      | 60.48 | 58.61 | 60.10 |
| July      | 60.26 | 59.06 | 59.61 |
| August    | 60.00 | 59.54 | 54.19 |
| September | 60.68 | 55.24 |       |
| October   | 60.42 | 57.87 |       |
| November  | 60.60 | 57.91 |       |
| December  | 59.42 | 68.01 |       |
| Year      | 58.26 | 59.79 |       |

## MONEY IN CIRCULATION.

Comparative statement of the circulation in the United States on July 1st 1899. Comparison being made with statement on June 1st, 1899:

| July 1.                   | Changes                         |
|---------------------------|---------------------------------|
| Gold                      | \$702,060,459 D. \$22,221,719   |
| Silver                    | 134,957,433 L. 578,236          |
| Legal Tenders             | 310,547,349 D. \$48,075         |
| Treas'y & N't'l B'k Notes | 339,435,386 D. 780,99           |
| Totals                    | \$1,477,103,527 D. \$22,972,552 |

Gold and Silver certificates and currency are not included in this table. By adding the amounts given in this table with those in the following will give the

total amount coined or issued. The figures herewith are furnished by the Bureau of Statistics Treasury Department.

## MONEY IN TREASURY.

Comparative statement of changes of money in United States Treasury during July 1st 1899, comparison being made with statement on June 1st, 1899.

|                           | July 1.          | Changes.     |
|---------------------------|------------------|--------------|
| Gold                      | \$153,522,506 L. | \$14,063,521 |
| Silver                    | 422,939,977 L.   | 739,681      |
| Legal Tenders             | 36,133,667 L.    | 548,975      |
| Treas'y & N't'l B'k Notes | 4,430,765 D.     | 521,924      |
| Totals                    | \$617,027,005 L. | 14,829,333   |

The Gold and Silver bullion on hand in the Treasury is not included in this statement.

## GOLD AND SILVER EXPORTS AND IMPORTS.

At all United States ports, for the month of June, 1899, and eleven months ending June, 1898, and 1899:

|                | JUNE           | 1898            | 1899 |
|----------------|----------------|-----------------|------|
| Gold—Exports   | \$375,529      | \$20,000,227    |      |
| Imports        | 3,330,612      | 3,105,686       |      |
| Excess         | I. \$3,955,083 | E. \$17,802,647 |      |
| Silver—Exports | \$4,156,650    | \$3,843,299     |      |
| Imports        | 2,025,801      | 1,895,393       |      |
| Excess         | E. \$2,127,847 | E. \$1,947,906  |      |

## TWELVE MONTHS ENDING JUNE.

| Gold—Exports   | 1898             | 1899            |
|----------------|------------------|-----------------|
| Exports        | \$15,406,391     | \$5,522,986     |
| Imports        | 120,391,674      | 88,954,693      |
| Excess         | I. \$104,985,283 | L. \$51,432,517 |
| Silver—Exports | \$5,105,439      | \$6,109,056     |
| Imports        | 30,927,781       | 30,073,056      |
| Excess         | E. \$24,177,458  | E. \$25,943,999 |

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

## The Cleveland Mining and Stock Exchange Co.

New England Building, Cleveland, Ohio.

A Reliable Information Bureau for Miners and Investors to obtain FACTS Regarding Capital and Mines. Stocks and Mines listed. Send for prospectus.

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MINES AND STOCKS  
We Buy, Sell, Lease and Bond Mines of all kinds.  
We Buy, Sell, and Negotiate sales of mining and other stocks.  
We Furnish Machinery to work good mines under special arrangement.  
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REFINERS

## ASSAYERS

Mint Prices paid for Gold and Silver Bullion. Returns made within four hours after receipt.

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\$35,000,000 in Dividends paid out by Utah Mines up to date.

## UTAH MINING STOCKS

Weekly Market Report on application. Reference: Any Bank in Salt Lake City. Quotations by wire or mail.

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SALT LAKE CITY, UTAH

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Other than above \$1.00 per month.  
Advertisements not accepted for less than one month.

COPPER MINE. State full particulars

in regard to development work location, distance from water, price of fuel, character of ore and returns from shipments. Must have at least 1500 feet of development work. Send all information possible. Address,

JAMES HOWARD,  
Care The Mining and Metallurgical Journal,  
150 Nassau St., New York, N. Y.

## GOLD mine anywhere in United States, must have at least 1000 feet of development; where coal is not over \$6.00 per ton or wood \$4.00 per cord delivered; plenty of water; no objection to low grade ore if profit can be made by having large plant to amalgamate and concentrate; want 6 months working bond; no property considered unless owners are prepared to deposit certified check for expenses of engineer if property is not as represented

Address with price and full particulars  
J. E. M., Mining and Metallurgical Journal,  
150 Nassau Street, New York, N. Y.

EXPERIENCED man desires position, who can install, run and keep in repair Steam, Electrical and Mining machinery. Knowledge of assaying and office work. References. Address: W. H. K. McCLOUD, CAL.

METALLURGIST and experienced Assayer and Chemist, with practical experience in Copper and Lead smelting, desires position. Speaks Spanish, highest references, address "Globe", JOURNAL office.

## NOTICE TO STEAM USERS.

The National Association of Stationary Engineers is prepared to furnish Engineers of guaranteed ability for any plant in the city or elsewhere. Give us a call.

Address: J. T. CHAMBERS, Sec'y,  
Engine Room City Hall.  
Tel. Main 557. Los Angeles, Cal.

WANTED POSITION by experienced Amalgamator and general Mill men. Have worked in the largest mill on Pacific Coast and Mexico, speaks Spanish, highest references. Apply Con. C. W. Geoghegan Assay Office, 956 3rd St., San Diego, Cal.

## COPPER MINE.

Partner wanted, (miner preferred) who would invest \$5,000 in developing a mining property in Mexico. Mine now working and has lately produced a considerable amount of ore. Object deeper development and ultimate placing of property on the market. No attention given to Broker or Middlemen. Call or address G. Peter-son, 323 Grant Ave., San Francisco, Cal.

## FOR SALE

A GROUP of 4 Copper claims in Northern Arizona. By-product of gold and silver, recently discovered and show great promise will sell at a great bargain.

E. R. HOTESPILLER,  
DEWEY, ARIZ.

TREMAIN Two Stamp Steam Mill at Tucson, Arizona. 15-H. P. Boiler Pump and every thing complete, set up ready for work. In excellent condition, used less than six months. Address DREDGING MINING MACHINERY CO. Kansas City, Mo.

ANTIMONY BISMUTH  
PROSPECTORS having locations of this nature and wishing to sell at once for cash, will do well to address with full particulars, P. O. Box 2078 SAN FRANCISCO, CAL.FOR SALE AT A BARGAIN.  
A 60-TON copper Smelting Plant, consisting of two 30 ton furnaces, one of which has new, seamless liner. Plant is complete in every detail. Also an 80-ton Silver-Lead Furnace, entirely new, never having been set up. All of the above located immediately adjacent to railroad. Enquire of GARDNER, WORTHEN & GOSS, dealers in Mining and Mill Supplies, Tucson, A. T.STEEL CASTINGS  
From 1 to 40,000 pounds weightChester Steel Castings Co.,  
Works Chester, Pa., Office, Library St  
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## John Wigmore &amp; Sons Co.

## HOISTING MACHINERY

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AMMONIA and

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For Chlorination, Refining and other processes. Also Muriatic and Nitric Acids, Blue Vitriol, Copperas, Refined Sulphate of Soda, Etc.

Handled and Operated by One Man will do the work of Two to Four Men.

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1756 Larmir Street, Denver, Colo.

THORNTON N. MOTLEY COMPANY, (Inc.)  
43 John St., New York.

Write for Circular.

## MINING STOCK QUOTATIONS

## BOSTON

|                 |           |                  |           |
|-----------------|-----------|------------------|-----------|
| Adventure       | 10 00     | Mass             | 11 00     |
| Aetna           | 4 00      | Merced           | 9 00      |
| Allouez         | 8 50      | Mohawk           | 26 00     |
| Anaconda        | 50 50     | Napa Quicksilver | 9 25      |
| Arcadian        | 56 00     | Old Colony Min   | 10 25     |
| Arnold          | 13 50     | Old Dominion     | 37 00     |
| Atlantic        | 32 00     | Osceola          | 88 75     |
| Baltic          | 31 00     | Parrot           | 57 50     |
| Bingham         | 11 50     | Pioneer          | 2 50      |
| Bonanza         | 2 50      | Quincy           | 150 00    |
| Boston & Mont's | 45 00     | Rhode Island     | 11 25     |
| Breeze          | 2 00      | Santa Fe         | 11 37 1/2 |
| Brown & Boston  | 77 00     | Santa Ysabel     | 14 25     |
| Calumet & Hecla | 780 00    | Tamarack         | 200 00    |
| Catalpa         | 35        | Tecumseh         | 5 25      |
| Centennial      | 33 37 1/2 | Tri-Mountain     | 10 50     |
| Cochiti         | 12 00     | Victor           | 3 50      |
| Copper Range    | 45 00     | Victoria         | 5 50      |
| Crescent        | 30        | United States    | 21 00     |
| Dominion Pref.  | 116 50    | Utah Mining      | 43 25     |
| Franklin        | 19 50     | Washington Mint  | 2 25      |
| Gold Dredging   | 34 50     | White Knob       | 11 50     |
| Humboldt        | 2 75      | Winona           | 13 50     |
| Isle Royale     | 46 00     | Wolverine        | 45 50     |
| Melones         | 4 00      | Wyandotte        | 5 50      |

## ROSSLAND, BRITISH COLUMBIA.

|                     |      |                     |      |
|---------------------|------|---------------------|------|
| Brand'n G'd'Cr'k    | 28   | Kootenay Gold F.    |      |
| Bett.-Amer. Cor.    | 5 50 | Lerwick             | 15   |
| Brit.-Col. Dev. Co  | 15   | Lily May            | 10   |
| Canad. G'd' Fields  | 10   | Lon & Van M. D. Co. |      |
| Cariboo             | 1 25 | London R. C. G.F.   | 7 50 |
| Commander           |      | Monte Cristo        |      |
| Deer Park           |      | New G'd'P'lds B.C.  | 50   |
| Dundee              | 15   | Novelty             |      |
| Evening Star        | 10   | Queen Bess Prop.    | 5 50 |
| Fern                |      | Rambler Con         | 28   |
| Gold Fields of B.C. | 05   | Red Mount, View     |      |
| Hattie Brown        |      | Reco                |      |
| Hall Mines          | 3 75 | Silver Bell         |      |
| Homestake           | 07   | Silver Queen        | 15   |
| Iron Horse          |      | St. Elmo            | 1 20 |
| Iron Mask           | 67   | Snowy Star          |      |
| Josie               |      | Vic. T. M. Dev. Co. |      |
| Jumbo               | 10   | Waverly Mines       |      |
| Kenneth             |      | War Eagle Con       | 3 65 |
| Keystone            |      | White Bear          | 10   |

## SAN FRANCISCO.

|                 |      |                  |      |
|-----------------|------|------------------|------|
| Alta Con        | 08   | Mexican          | 47   |
| Andes           | 14   | Occidental       | 18   |
| Belcher         |      | Ophir            | 1 00 |
| Best & Belcher  | 58   | Overman          | 11   |
| Bullion         | 05   | Ontario          |      |
| Caledonia       | 55   | Plymouth         |      |
| Challenge       | 30   | Potosi           | 30   |
| Chollar         | 51   | Quicksilver      |      |
| Confidence      | 75   | Quicksilver pref |      |
| Con. Cal. & Va. | 1 70 | Savage           | 16   |
| Crown Point     | 20   | Se. Belcher      | 05   |
| Deadwood        |      | Sierra Nevada    | 68   |

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Assayer and Chemist,  
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LEADVILLE, COLORADO  
Samples by Mail or Express Re-  
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## SPECIMEN ASSAY PRICES:

Gold silver and lead, \$1.00; any two of the above, 75¢; any one of above, 50¢; copper analy-  
sis, \$1; platinum, nickel or tin, \$5.00.  
Write for full price list and mailing envelope.

## THE MINING AND METALLURGICAL JOURNAL.

|                 |    |               |      |
|-----------------|----|---------------|------|
| Gould & Curry   | 38 | Silver Hill   | 2 70 |
| Hale & Norgross | 30 | Standard      | 2 21 |
| Homestake       |    | Union Con     | 07   |
| Iron Silver     |    | Utah          | 07   |
| Justice         |    | Yellow Jacket | 28   |

## COLORADO SPRINGS STOCKS

|                     |        |                 |          |
|---------------------|--------|-----------------|----------|
| Acacia              | 18 1/2 | Hayden          | 02 1/2   |
| Alamo               | 09 1/2 | Ingham Con      | 09       |
| Altamont            |        | Isabella        | 84 1/2   |
| American Con        |        | Jack Pot        | 55       |
| Anaconda            | 51     | Kimberly        | 07 1/2   |
| Aola                | 03 1/2 | Lexington       | 10 25    |
| Arcadia Cons        | 05 1/2 | Magnet Rock     | 05 1/2   |
| Argentum Juniat     | 28 1/2 | Matao           | —        |
| Belcher             | 10 1/2 | Montreal        | —        |
| Best & Belcher      | 55     | Mountain Beauty | 08 1/2   |
| Bob Lee             | 03 1/2 | Mollie Gibson   | 25       |
| Creedi & C. C.      | 11 1/2 | Moon Anchor     | 1 1/2    |
| Cripple Cr'k Con    | 12 1/2 | Mount Rosa      | 3 1/2    |
| Dance               | 17 1/2 | New Haven       | 08 1/2   |
| Des Moines          | 01 1/2 | Orphan          | 19 1/2   |
| El Paso             | 45     | Pharmacist      | 04 1/2   |
| Emma Aimee          | 02 1/2 | Portland        | 2 00     |
| Fanny B.            | 04 1/2 | Rattler         | 04       |
| Favorite            | 05 1/2 | Re. Albert      | 04       |
| Findley             | 18 1/2 | Rattler         | 03 1/2   |
| F'l'wer of the W'st | 03 1/2 | Specimen        | 11 1/2   |
| Golden Fleece       | 25     | Theresa         | 3 1/2    |
| Gold & Globe        | 07 1/2 | Trachyte        | 07 1/2   |
| Gold King           | 90     | Union           | 1 38 1/2 |
| Gould               | 23     | Vindicator      | 1 38 1/2 |
| Granite Hill        | 03     | Work            | 28 1/2   |

## SALT LAKE CITY

|                   |          |                   |          |
|-------------------|----------|-------------------|----------|
| Anchor            | 50       | Ice Bowers Ex.    | 07       |
| Ajax              | 1 00     | La Reine          | 80 1/2   |
| Alliance          | 41       | Lower Mammoth     | 27 1/2   |
| Alice             | 60       | Little Pittsburg  | 06       |
| Allison           | 60       | Mammoth           | 1 93 1/2 |
| Buckley           | 5 05     | Mammoth           | —        |
| Buckeye           |          | Mercur            | 7 08     |
| Cent. Eureka      | 68 50    | May Day           | 76       |
| Chloride Point    | 44       | Northern Light    | 28 1/2   |
| Daly              | 1 38     | North Swansca     | 14 1/2   |
| Daly West         | 13 01    | Omaha             | 24 1/2   |
| Dalton & Lark     | 08 1/2   | Ontario           | 8 25     |
| Dalton            | 02 1/2   | Petro             | 81 1/2   |
| Dexter            | 1 95     | Rich. Anacoda     | 11       |
| Daisy             | 25 1/2   | Sunshine          | 51       |
| Eagle             | 05 1/2   | Swansca           | 4 27     |
| Eagle & Blue Bell | 1 60     | St. Swansca       | 1 62     |
| Emerald           | 11       | Sunbeam           | 50 1/2   |
| Four Aces         | 27 1/2   | Sumento           | 47 1/2   |
| Gold & Marion     | 39 1/2   | Silver King       | 49 00    |
| Galena            | 39       | Star Consolidated | 50       |
| Grand Central     | 7 57 1/2 | Shower Con        | 45 1/2   |
| Golden Eagle      | 04 1/2   | Tetro             | 10 1/2   |
| Horn Silver       | 1 22 1/2 | Utah              | 75       |
| Homestake         | 10 1/2   | Valeo             | 77       |
| Ingot             | 15 1/2   | West M't'n Pl'cer | 30       |
| Joe Bowers        | 18 1/2   | Yankee Con        | 15 1/2   |

## ADOLF FRESE

## Maker and Repairer



126 S. SPRING STREET

Los Angeles, California

The Southern California Lumber Co., Slimson Blk., Los Angeles, Cal., Chas. Wier Manager, sells

## LUMBER

At Wholesale Prices

Mining Timbers a Specialty

Write for Prices

AIR COMPRESSORS  
ROCK DRILLS,  
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The Pohle Air Lift Pump,  
Coal Cutters,  
THE INGERSOLL-SERGEANT DRILL COMPANY,  
PARKE & LACY CO., AGENTS, SAN FRANCISCO, CAL.

## NEW YORK.

|                  |        |                 |        |
|------------------|--------|-----------------|--------|
| Adams Con        | 10     | Isabella        | 97     |
| Alamo            | 09 1/2 | Iron Silver     | 50     |
| Alice            | 80     | Jefferson       | —      |
| Alliance         | —      | Jennie Blanche  | —      |
| Anaconda         | 57     | Justine         | 01     |
| Anaconda Gold    | 51     | King & Pemb     | 08     |
| Anchoria L.      | 72     | Leadville Cons  | 19     |
| Argentum Juniat  | —      | Little Chief    | 19     |
| Belcher          | 27     | Mexican         | 48     |
| Best & Belcher   | 55     | Mollie Gibson   | 25     |
| Bob Lee          | —      | Mt. Rosa        | 26     |
| Brecon           | 1 80   | Occidental      | 18     |
| Chollar          | 18     | Ophir           | 7 50   |
| Chrysolite       | 20     | Pharmacist      | 05     |
| Comstock Tunnel  | 04     | Phoenix         | 11     |
| Comstock Stocks  | 04     | Plymouth        | 08     |
| Con. Cal. & Va.  | 1 75   | Portland        | 1 75   |
| Crown Point      | 20     | Potosi          | 38     |
| Deadrwood Terra  | 60     | Quicksilver     | 1 90   |
| Diamond          | 1 07   | Rocky Mountain  | —      |
| Enterprise       | —      | Rocky Mountain  | —      |
| Gold Coin        | —      | Rocky Mountain  | —      |
| Gold Fleece      | 25     | Rocky Mtn. pfd. | 8 52   |
| Gold King        | —      | Rocky Mtn. pfd. | —      |
| Good Samaritan   | —      | Specimen        | 65     |
| Gold Coin C. C'  | 20     | Standard Con.   | 2 50   |
| Gold Coin Gilpin | —      | Standard Con.   | 2 50   |
| Golden Fleece    | 25     | Standard Con.   | 31     |
| Golden Globe     | 35     | Union           | 08     |
| Gold King        | —      | Union Gold      | —      |
| Hale & Norgross  | 25     | Vindicator      | —      |
| Homestake        | 65 00  | Work            | 28 1/2 |
| Horn Silver      | 1 35   | Yellow Jacket   | 34     |

|                 |        |               |        |
|-----------------|--------|---------------|--------|
| Bob Lee         | 03 1/2 | Old Gold      | —      |
| Bikton          | 1 01   | Peoples       | 07     |
| El Paso         | 45     | Pilgrim       | —      |
| Enterprise      | 12 1/2 | Pine Creek    | —      |
| Fanny B.        | 0045   | Portland      | 2 00   |
| Garfield        | 15 1/2 | Prince Albert | 04     |
| Geo. Washington | —      | Republic      | 07 1/2 |
| Golden Eagle    | —      | Sacramento    | 08 1/2 |
| Gold Coin       | 2 08   | Smuggler      | —      |
| Gold Fleece     | 25     | Tamarrack     | —      |
| Isabella        | 84 1/2 | Virginia M.   | 05 1/2 |
| Iron Clad       | 05 1/2 | Wheels Cons.  | —      |
| Jack Pot        | 55     | Work          | 28     |

## MEXICO

| Name of Company     | State          | Price |
|---------------------|----------------|-------|
| Amistad y Concordia | Hidalgo        | 25    |
| Angustias           | Guanajuato     | 315   |
| Arevalo y Anexas    | Hidalgo        | 200   |
| Asturiana y Anexas  | Zacatecas      | 175   |
| Bartolome y Cabras  | Durango        | 40    |
| Cabazon de Medina   | Hidalgo        | 65    |
| Cacandela y An.     | Zacatecas      | 15    |
| Candelaria de Pinos | Hidalgo        | —     |
| Carmen              | Durango        | 100   |
| Cinco Señores y An. | Guanajuato     | 335   |
| Concepcion y Anexas | S. Luis Potosi | 100   |
| Coronas             | Mexico         | 75    |
| El Oro              | Guanajuato     | 30    |
| El Oro, pref.       | Guanajuato     | 30    |
| Esparanza y An.     | Mexico         | 1,550 |
| Gloria              | Guanajuato     | 230   |
| Guadalupe           | Mexico         | 30    |
| Luz de Borda Aviado | Mexico         | —     |
| Luz de Borda aviado | Mexico         | —     |
| Luz de Maravillas   | Hidalgo        | 120   |
| Palma de Somb.      | Zacatecas      | 20    |
| Pinos               | Durango        | 2,000 |
| Rafael y Anexes     | Hidalgo        | 1,000 |
| Rasel del Monte     | Hidalgo        | 700   |
| Restauradora        | Durango        | 20    |
| Rosario y Anexas    | Durango        | 10    |
| San Francisco       | Hidalgo        | 190   |
| San Rafael aviado   | Hidalgo        | 400   |
| San Rafael del Oro  | Hidalgo        | 20    |
| S. Maria de la Paz  | S. Luis Potosi | 720   |
| Soledad             | Hidalgo        | 300   |
| Sorpresas           | "              | 240   |
| Trinidad Aviador    | Guanajuato     | 60    |
| Trinidad Aviado     | Guanajuato     | 60    |
| Tlaxiango           | Puebla         | 28    |
| Union Hacienda      | Hidalgo        | 380   |
| Zona Min. de Paz    | Guanajuato     | 65    |

NOTE.—The above Mexican stocks are figured on the basis of Mexican silver

JAMES F. BURNS, Pres't.  
JOHN HARNAN, Gen. Man.  
FRANK O. BECK, Sec'y and Treas.  
THE PORTLAND GOLD MINING CO.,  
(Stock Transfer Office, Colorado Springs.)  
Mines at Victor, Colorado.

COLORADO SPRINGS, CO., May 19, 1898

The Ingersoll-Sergeant Drill Co.,  
Colorado. We bought two years ago one of the largest  
size of the straight line type of Ingersoll-Sergeant Piston  
Inlet Compressor.This was found to be too small for our needs about a year  
ago and we purchased of you a Duplex Corliss machine  
16" x 18 1/2" x 42".This was set in place in our shaft house in the Cripple Creek  
District, 10,000 feet above the level of the sea, and has been  
running continuously ever since, and at times over in 3 1/2".  
Eclipse drills. The steam Cylinders were connected to an In-  
dependent Jet Condenser, for which we are using the mine  
water, and the resultant economy of operation is very  
noticeable.The operation of this Compressor is as near perfect as  
that of any machine we have ever seen, and this type is well  
worth the extra cost on account of the great permanent  
economy in operation.Our mine is equipped exclusively with your drills and we  
have only the highest words of praise to give them.  
Yours very truly, THE PORTLAND GOLD MINING CO.,  
JAS. A. BURNS, President

## INCORPORATED MINES PAYING DIVIDENDS.

| NAME OF MINES                      | LOCATION        | No. of Shares | Capital Stock | Par Value | Amount of last Dividend | Date of Last Dividend | Total Amount Paid in Dividends | Kind of Mineral Produced |
|------------------------------------|-----------------|---------------|---------------|-----------|-------------------------|-----------------------|--------------------------------|--------------------------|
|                                    |                 |               |               |           |                         |                       |                                |                          |
| 1 Aetna Cons.                      | California      | 100,000       | 500,000       | \$ 5      | \$ 10                   | July 1899             | \$ 180,000                     | Q.                       |
| 2 Alamo                            | Utah            | 125,000       | 125,000       | 1         | 02                      | April 1899            | 2,500                          | G, C, I.                 |
| 3 Alaska, Treadwell                | Alaska          | 200,000       | 5,000,000     | 25        | 37½                     | Apr 1899              | 4,070,000                      | G.                       |
| 4 Alaska Mexican                   | Alaska          | 200,000       | 1,000,000     | 5         | 10                      | Apr 1899              | 353,031                        | G.                       |
| 5 Anaconda                         | Montana         | 1,200,000     | 30,000,000    | 25        | 1 25                    | May 1899              | 9,750,000                      | G.                       |
| 6 Anchors Leland                   | Colorado        | 600,000       | 600,000       | 1         | 03                      | Apr 1899              | 198,000                        | G.                       |
| 7 American Gold                    | Colorado        | 300,000       | 3,000,000     | 10        | 07                      | Mar 1899              | 407,000                        | G. S. L.                 |
| 8 American Coal                    | Maryland        | 60,000        | 1,500,000     | 25        | 1 25                    | March 1899            | 652,500                        | Coal                     |
| 9 American Zinc, Lead and Smelting | Missouri        | 200,000       | 500,000       | 25        | 10                      | July 1899             | 20,000                         | Z, L.                    |
| 10 Aurora                          | Michigan        | 100,000       | 2,500,000     | 25        | 50                      | June 1899             | 890,000                        | I.                       |
| 11 Argonaut                        | California      | 200,000       | 2,000,000     | 10        | 10                      | June 1899             | 300,000                        | .....                    |
| 12 Bald Butte                      | Montana         | 250,000       | 250,000       | 1         | 06                      | May 1899              | 702,148                        | G. C. S.                 |
| 13 Bonanza Development             | New Mexico      | 300,000       | 3,000,000     | 10        | 3 50                    | June 1899             | 1,500,000                      | .....                    |
| 14 Boston & California             | California      | 600,000       | 600,000       | 1         | 06                      | March 1899            | 38,000                         | .....                    |
| 15 Boston and Colorado Smelting    | Colorado        | 15,000        | 750,000       | 50        | 5 00                    | April 1899            | 375,000                        | .....                    |
| 16 Boston & Montana                | Montana         | 150,000       | 3,750,000     | 25        | 6 00                    | May 1899              | 10,775,000                     | G, C, S.                 |
| 17 Breeze                          | Colorado        | 200,000       | 5,000,000     | 25        | 05                      | June 1899             | 50,000                         | I.                       |
| 18 Bullion Beach and Champion      | Utah            | 100,000       | 1,000,000     | 10        | 10                      | June 1899             | 2,378,400                      | G. S.                    |
| 19 Bunker Hill and Sullivan        | Idaho           | 300,000       | 8,000,000     | 10        | 07                      | May 1899              | 705,000                        | S. L.                    |
| 20 Cariboo                         | British Col.    | 80,000        | 800,000       | 1         | 01½                     | Feb 1899              | 248,965                        | G.                       |
| 21 Calumet & Hecla                 | Michigan        | 10,000        | 2,500,000     | 25        | 20 00                   | June 1899             | 62,850,000                     | C.                       |
| 22 Centennial Eureka               | Utah            | 30,000        | 1,500,000     | 50        | 50                      | June 1899             | 2,120,000                      | S. L.                    |
| 23 Central Lead                    | Missouri        | 10,000        | 1,000,000     | 100       | 50                      | June 1899             | 112,000                        | L.                       |
| 24 Charleston                      | S. Carolina     | 10,000        | 1,000,000     | 100       | 2 00                    | June 1899             | 200,000                        | .....                    |
| 25 Colorado Smelting               | Montana         | 100,000       | 1,000,000     | 10        | 1 00                    | Jan 1899              | 1,945,000                      | G. S. C.                 |
| 26 Consolidated Tiger and Poorman  | Idaho           | 1,000,000     | 1,000,000     | 1         | 02                      | Dec 1898              | 20,000                         | G. S.                    |
| 27 Creston Leasing                 | Colorado        | 1,000,000     | 1,000,000     | 1         | 01                      | Dec 1898              | 54,00                          | .....                    |
| 28 Crowned King                    | Arizona         | 600,000       | 8,000,000     | 10        | 02                      | Dec 1898              | 232,000                        | G. S. L.                 |
| 29 De Lamar                        | Idaho           | 4' 0,000      | 2,000,000     | 5         | 12                      | May 1899              | 2,346,000                      | G. S.                    |
| 30 Deer Trail No 2                 | Washington      | 1,000,000     | 1,000,000     | 1         | 00½                     | June 1899             | 32,500                         | .....                    |
| 31 Doe Run                         | Missouri        | 5,000         | 500,000       | 100       | 50                      | June 1899             | 75,000                         | L.                       |
| 32 Empire State                    | Idaho           | 75,000        | 750,000       | 10        | 20                      | July 1899             | 185,638                        | .....                    |
| 33 Fanny Rawlings                  | Colorado        | 1,000,000     | 1,000,000     | 1         | 01                      | May 1899              | 10,000                         | G. S.                    |
| 34 Ferris-Haggerty                 | Wyoming         | 1,000,000     | 1,000,000     | 1         | 00½                     | Mar 1899              | 5,000                          | G, G. S.                 |
| 35 Garfield Consolidated           | Colorado        | 1,200,000     | 1,200,000     | 1         | 01                      | May 1899              | 34,000                         | G.                       |
| 36 Golden Star                     | Ontario, Canada | 100,000       | 100,000       | 1         | 01                      | July 1899             | 41,000                         | .....                    |
| 37 Gold Coin of Victor             | Colorado        | 1,000,000     | 1,000,000     | 1         | 01                      | June 1899             | 210,000                        | G.                       |
| 38 Gold King                       | Colorado        | 1,000,000     | 1,000,000     | 1         | 02                      | May 1899              | 30,000                         | G.                       |
| 39 Golden Cycle                    | Colorado        | 200,000       | 1,000,000     | 5         | 05                      | June 1899             | 198,500                        | .....                    |
| 40 Grand Central                   | Utah            | 250,000       | 250,000       | 1         | 15                      | June 1899             | 531,250                        | G, S. C. L.              |
| 41 Gwin                            | California      | 20,000        | 1,000,000     | 50        | 25                      | June 1899             | 71,500                         | G.                       |
| 42 Grass Valley Exploration        | California      | 50,000        | 100,000       | 2         | 25                      | July 1899             | 12,500                         | .....                    |
| 43 Helena and Frisco               | Idaho           | 500,000       | 2,500,000     | 5         | 25                      | June 1899             | 550,000                        | S. L.                    |
| 44 Highland                        | S. Dakota       | 100,000       | 10,000,000    | 100       | 20                      | July 1899             | 3,924,718                      | G.                       |
| 45 Holy Terror                     | S. Dakota       | 300,000       | 300,000       | 1         | 01                      | Mar 1899              | 122,000                        | G.                       |
| 46 Homestake                       | S. Dakota       | 125,000       | 12,500,000    | 100       | 50                      | June 1899             | 7,556,250                      | G.                       |
| 47 Horn Silver                     | Utah            | 400,000       | 10,000,000    | 25        | 05                      | July 1899             | 5,270,000                      | S. L.                    |
| 48 Idaho                           | British Col.    | 500,000       | 500,000       | 1         | 05½                     | Jan 1899              | 292,000                        | .....                    |
| 49 Isabella                        | Colorado        | 2,250,000     | 2,250,000     | 1         | 02                      | June 1899             | 448,500                        | G.                       |
| 50 Jack Pot                        | Colorado        | 1,000,000     | 1,000,000     | 1         | 02½                     | Mar 1899              | 25,000                         | G.                       |
| 51 Jamison                         | California      | 390,000       | 3,900,000     | 10        | 10                      | April 1899            | 50,700                         | .....                    |
| 52 Lake Superior Iron              | Michigan        | 84,000        | 2,100,000     | 25        | 1 00                    | Feb 1899              | 736,000                        | L.                       |
| 53 Lillie                          | Colorado        | 1,000,000     | 1,000,000     | 1         | 05                      | July 1899             | 235,360                        | G.                       |
| 54 Modoc                           | Colorado        | 500,000       | 500,000       | 1         | 02                      | June 1899             | 140,000                        | G.                       |
| 55 Montana Ltd.                    | Montana         | 660,000       | 3,300,000     | 5         | 12                      | Apr 1899              | 2,997,557                      | G. S.                    |
| 56 Montana Ore Purchasing          | Montana         | 40,000        | 1,000,000     | 25        | 1 00                    | July 1899             | 1,200,000                      | .....                    |
| 57 Morning Star                    | California      | 2,400         | 240,000       | 100       | 2 50                    | June 1899             | 732,600                        | G.                       |
| 58 Mercur                          | Utah            | 200,000       | 5,000,000     | 25        | 12½                     | Jan 1899              | 1,268,000                      | G.                       |
| 59 Mammoth                         | Utah            | 400,000       | 10,000,000    | 25        | 20                      | July 1899             | 1,430,000                      | G, S. C. L.              |
| 60 Mead                            | California      | 2,000,000     | 2,000,000     | 1         | 20                      | June 1899             | 120,000                        | G.                       |
| 61 Monument                        | Colorado        | 300,000       | 300,000       | 1         | 01                      | Dec 1898              | 12,624                         | .....                    |
| 62 Moulton                         | Montana         | 400,000       | 2,000,000     | 5         | 05                      | Feb 1899              | 480,000                        | .....                    |
| 63 Mt. Shasta                      | California      | 20,000        | 100,000       | 5         | 30                      | May 1899              | 8,000                          | .....                    |
| 64 New York & Hon. Rosario         | Central A       | 150,000       | 1,600,000     | 10        | 10                      | June 1899             | 1,850,000                      | S. G.                    |
| 65 Napa Cons.                      | California      | 100,000       | 700,000       | 7         | 20                      | July 1899             | 1,100,000                      | Q.                       |
| 66 New Idria Quicksilver           | California      | 100,000       | 500,000       | 5         | 20                      | July 1899             | 140,000                        | Q.                       |
| 67 North Star                      | California      | 200,000       | 2,000,000     | 10        | 25                      | Apr 1899              | 550,000                        | G.                       |
| 68 Original Empire                 | California      | 50,000        | 5,000,000     | 100       | 1 00                    | May 1899              | 500,000                        | G.                       |
| 69 Osceola                         | Michigan        | 50,000        | 1,250,000     | 25        | 3 00                    | June 1899             | 2,801,500                      | C.                       |
| 70 Parrot                          | Montana         | 230,000       | 2,300,000     | 10        | 1 50                    | May 1899              | 2,890,898                      | C.                       |
| 71 Pennsylvania Consolidated       | California      | 51,500        | 5,150,000     | 10        | 20                      | July 1899             | 84,975                         | .....                    |
| 72 Pioneer                         | California      | 100,000       | 1,000,000     | 10        | 12½                     | Mar 1899              | 62,500                         | G.                       |
| 73 Portland                        | Colorado        | 3,000,000     | 3,000,000     | 1         | 02                      | June 1899             | 2,197,080                      | G, S.                    |
| 74 Plumbago                        | California      | 300,000       | 300,000       | 1         | 15                      | Jan 1899              | 45,000                         | G.                       |
| 75 Quicksilver Pref.               | California      | 43,000        | 4,300,000     | 100       | 50                      | May 1899              | 1,845,411                      | Q.                       |
| 76 Quicksilver Consolidated        | California      | 57,000        | 5,700,000     | 100       | 40                      | July 1899             | 643,867                        | Q.                       |
| 77 Quincy                          | Michigan        | 100,000       | 2,500,000     | 25        | 6 00                    | August 1899           | 11,070,000                     | C.                       |
| 78 *Republic Consolidated          | Washington      | 3,000,000     | 3,000,000     | 1         | 01                      | June 1899             | 188,000                        | G.                       |
| 79 Rambler-Cariboo                 | British Col.    | 1,000,000     | 1,000,000     | 1         | 01                      | April 1899            | 50,000                         | .....                    |
| 80 Royal Consolidated              | British Col.    | 2,500,000     | 2,500,000     | 1         | 01                      | June 1899             | 1,050,000                      | G.                       |
| 81 Sacramento                      | Utah            | 1,000,000     | 5,000,000     | 5         | 00½                     | July 1899             | 92,500                         | G.                       |
| 82 Small Hopes Consolidated        | Colorado        | 250,000       | 5,000,000     | 20        | 10                      | Feb 1899              | 3,325,000                      | S.                       |
| 83 South Swansea                   | Utah            | 150,000       | 150,000       | 1         | 05                      | June 1899             | 126,560                        | S. L.                    |
| 84 Standard                        | Idaho           | 500,000       | 500,000       | 1         | 06                      | Apr 1899              | 1,745,000                      | G, S.                    |
| 85 Standard Consolidated           | California      | 200,000       | 20,000,000    | 100       | 10                      | May 1899              | 3,859,226                      | G, S.                    |
| 86 St. Joseph                      | Missouri        | 30,000        | 3,000,000     | 10        | 50                      | June 1899             | 2,859,500                      | L.                       |
| 87 Silver King                     | Utah            | 150,000       | 3,000,000     | 20        | 25                      | June 1899             | 2,025,000                      | S. L. G.                 |
| 88 Smuggler                        | Colorado        | 1,000,000     | 1,000,000     | 1         | 01                      | June 1899             | 1,155,000                      | S. L. Z.                 |
| 89 Swansea                         | Utah            | 10,000        | 500,000       | 5         | 05                      | June 1899             | 168,500                        | S. L.                    |
| 90 Tamarack                        | Michigan        | 60,000        | 1,500,000     | 15        | 4 00                    | June 1899             | 5,910,000                      | C.                       |
| 91 Tomboy                          | Colorado        | 200,000       | 2,000,000     | 10        | 4 00                    | May 1899              | 730,000                        | G.                       |
| 92 Utah                            | Utah            | 100,000       | 1,000,000     | 10        | 02                      | Jan 1899              | 179,000                        | G.                       |
| 93 Vindicator Consolidated         | Colorado        | 1,500,000     | 1,500,000     | 1         | 05                      | July 1899             | 253,750                        | G.                       |
| 94 War Eagle Consolidated          | British Col.    | 2,000,000     | 1,000,000     | 1         | 01½                     | June 1899             | 335,250                        | .....                    |
| 95 Wolverine                       | Michigan        | 60,000        | 2,500,000     | 25        | 1 50                    | April 1899            | 150,000                        | C.                       |
| 96 Yellow Aster                    | California      | 100,000       | 1,000,000     | 10        | 10                      | May 1899              | 203,789                        | G.                       |

S. Silver; G. Gold; L. Lead; C. Copper; Q. Quicksilver; I. Iron; Z. Zinc.  
 N. B.—Companies not listed paid nothing in the last twelve months. \*Paid since consolidation, \$63,000; Republic paid \$120,000 under old management.

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Designed with some Regard for the Laws of Concentration

The perfect vanner motion given to the pulp by our head motion together with the freedom from "jumping" resulting from the special rigid guides used, explains why the Cammett rifles never "pack," and why the table has such a great capacity when handling slimes.

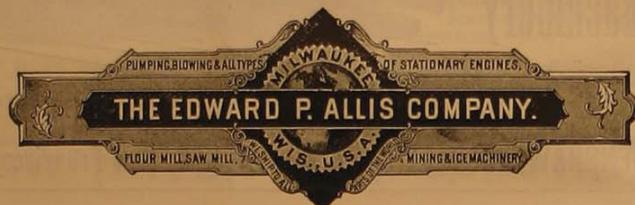
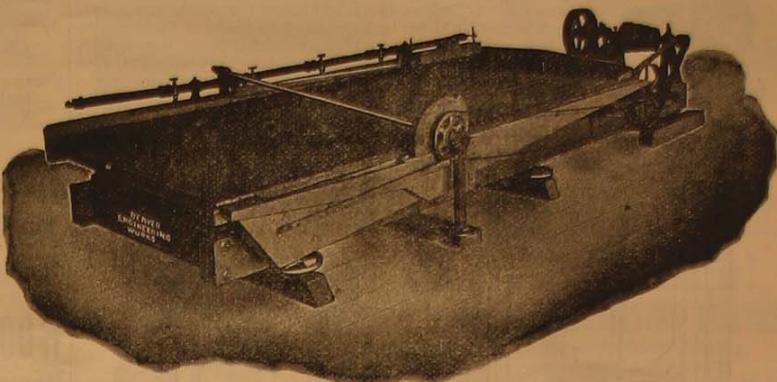
The continuous grooves and rifles extending from end to end of the table maintains the greatest possible margin of safety between the concentrates discharge and the tailings.

Thoroughly protected by strong patents.

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Shepard & Searing,  
Sole Manufacturers.

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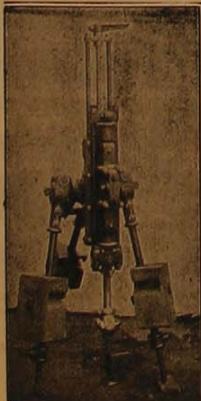
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Rapid, Strong, Convenient, For Mining, Shaft Sinking,  
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Operated by Hand, Horse Power, Steam, Compressed Air  
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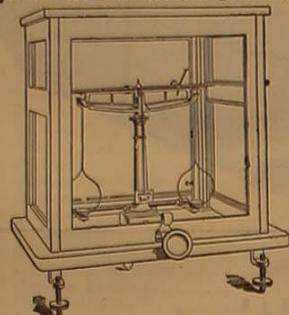


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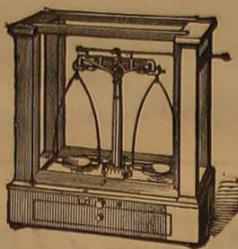
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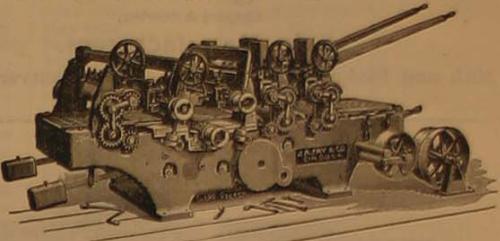
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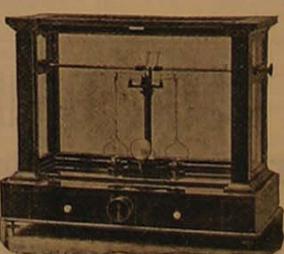
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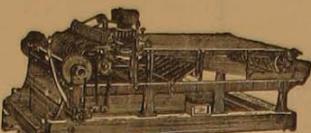
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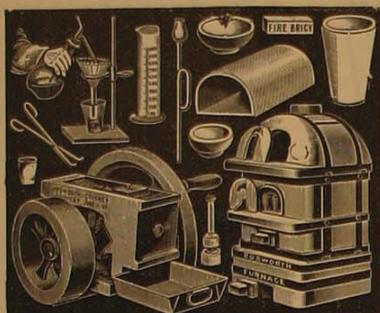


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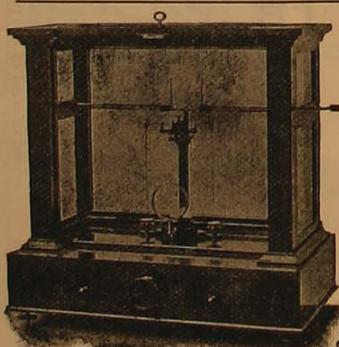
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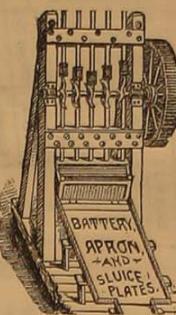
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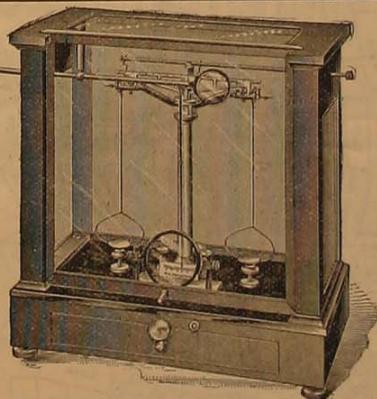
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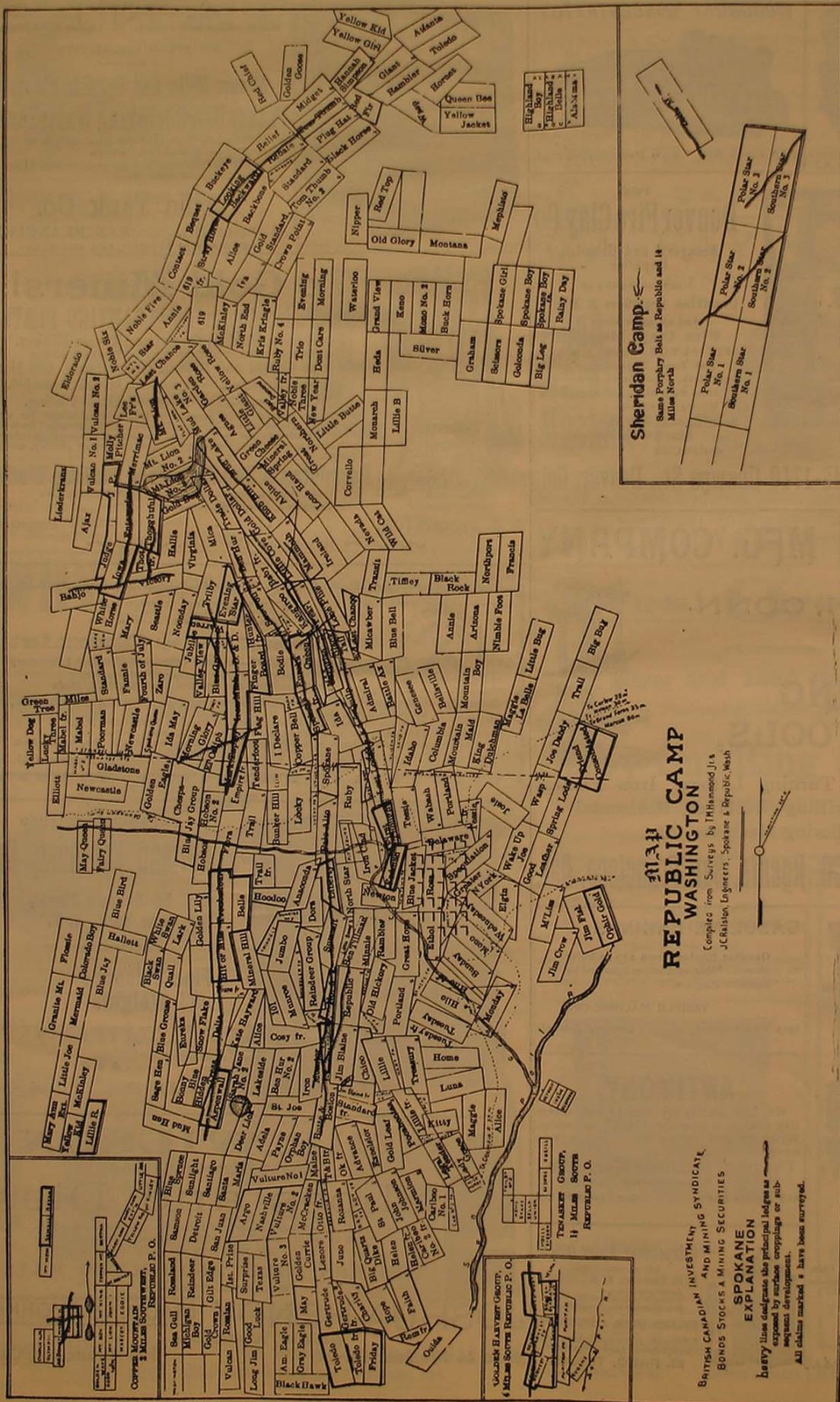
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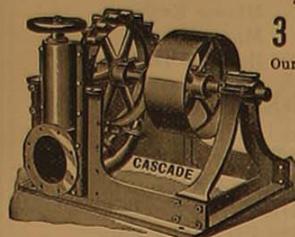
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by some prospectors sent out from Rossland, B. C., in February, 1896, by James Clark, then superintendent of the War Eagle mine, and two or three others connected with that property.

deep in the Republic during the summer of 1890, Patrick Clark found some high grade ore, and soon known as Eureka camp, but now as Republic, in the spring after he had sold the War Eagle mine, and he was so well pleased with the showing on the Republic that he purchased two interests for \$60,000 cash, and secured control of the property.



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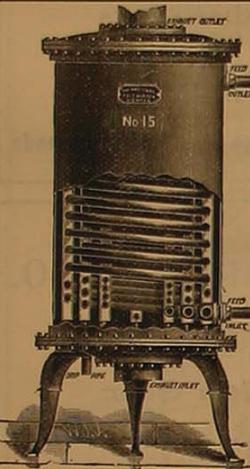
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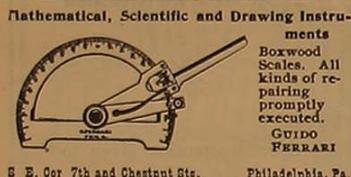
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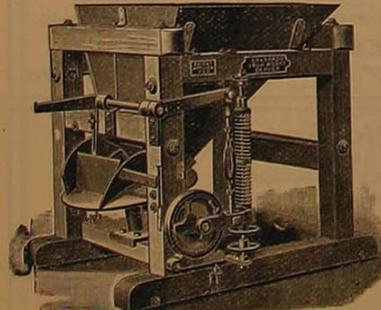
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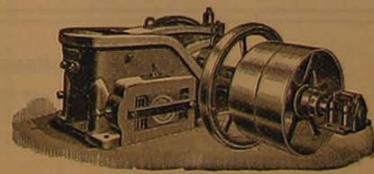
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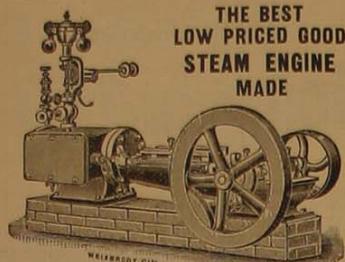
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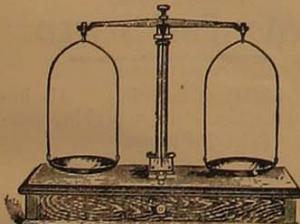
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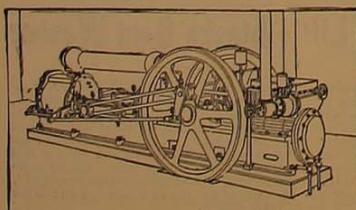


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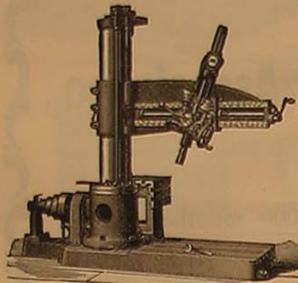
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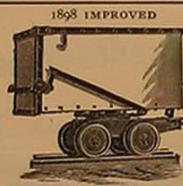
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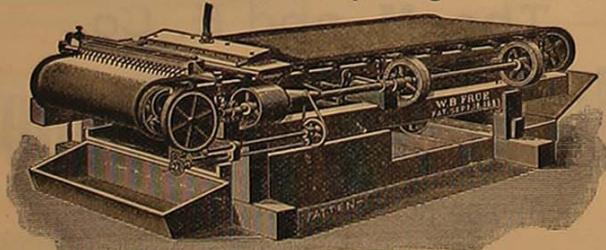
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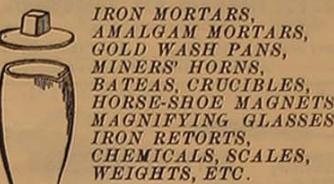
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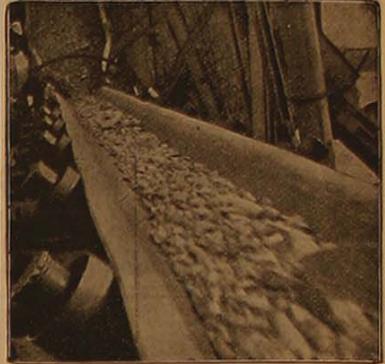
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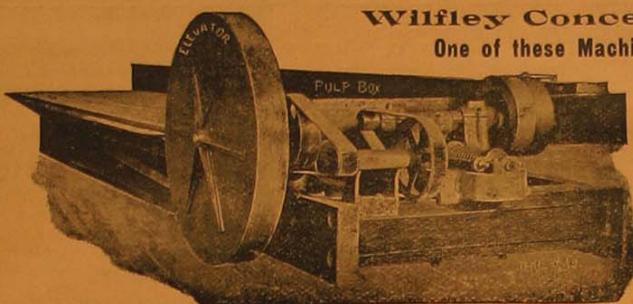
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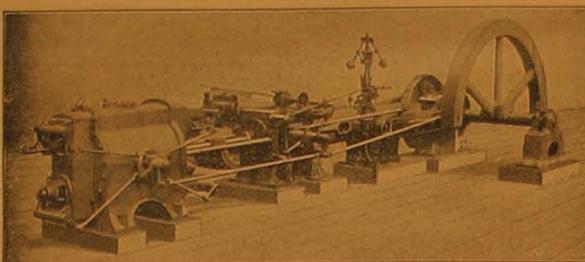


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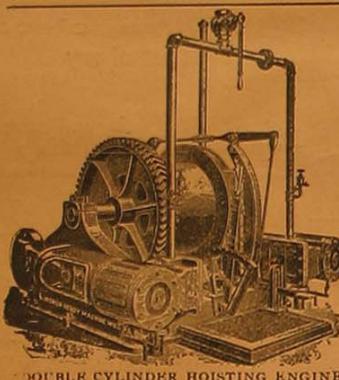
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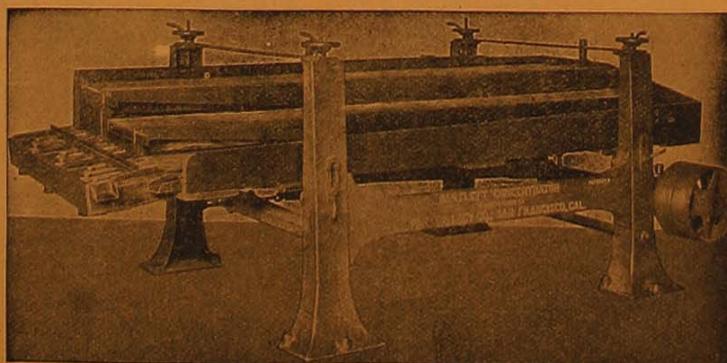
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